Safety Precautions

1. Reserve this manual for the entire service lifetime of the product.
2. Read this manual carefully before carrying out any operation on the product.
3. 'Note, Warning' in this manual don't represent the entire safety points to be observed, and are only the supplements.
4. This product is the professional equipment used in industrial, commercial or other professional occasions. It should not be sold to the general person.
5. This product is used only for the purpose of its design, the manufacturers doesn't assume any responsibility for the incorrect use.
6. The key to the product must be kept by the personnel responsible for maintenance.

Electrical Safety

1. You must use insulated tools when carrying out the electrical connection.
2. To avoid the more serious faults and damages, you should find the reason causing the alarm immediately and handle the faults after the alarm occurs through the monitoring platform.
3. The backfeed protection unit is external. For its using method, refer to UF-BFP-63A Backfeed Protection Unit User Manual.

Warning: Backfeed Protection
Before operating on the circuit, first isolate the UPS, and then check whether dangerous voltage exists between the ports as well as between the port and the ground.

Potential Risk

1. Only after all power is disconnected can you operate the inner components of the product.
2. Before operating on the inner components for any maintenance, you must switch off the mains breaker and all UPS power.

Risk of Electric Shock

Electric shock can cause personnel injury or death, you should pay attention to:

1. Disconnect the control box and the remote power supplies before working in the product.
2. Before proceeding with installation, read all instructions, verify that all the parts are included and check the nameplate to be sure the voltage matches available mains.
3. Follow all local codes.

Warning: Large Leakage Current
1. Before connecting input power (including AC mains and battery), please ensure reliable grounding. 2. The leakage current to earth is larger than 3.5mA and lower than 5% of the input current.

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Chapter 1 Overview

SmartCabinet integrated solution (SmartCabinet for short) is a datacenter solution produced by Emerson Network Power Co., Ltd.; it is applicable to the indoor environment such as miniature datacenter or office area. SmartCabinet is used to store the 19'' rack mount hardware equipment which complies with the industry-standard (EIA-310-D) such as server, voice, data, Internet network equipment, it contains power supply and distribution system, air conditioning system, rack supporting system and monitoring and management system. The four systems work closely with each other with seamless compatibility, thus realizing high-efficiency operating of miniature datacenter and maintaining normal and stable operation of important devices such as servers inside the cabinet. Standard design, standard field installation, no need of raised floor and integrated delivery shorten the delivery period to great extent. The monitoring management system is based on a strong datacenter monitoring management platform of Emerson, and is compatible with all series of Emerson products, plug and play; it also provides energy consumption analysis. All these added valves can hardly be realized by separated purchase. In all, the product helps the customers build a green and healthy datacenter quickly.

This chapter expands the model description, specification, features, appearance & components, functional parts, operating condition and environment requirement of the SmartCabinet.

1.1 Model Description

The model description of the SmartCabinet is shown in Figure 1-1.

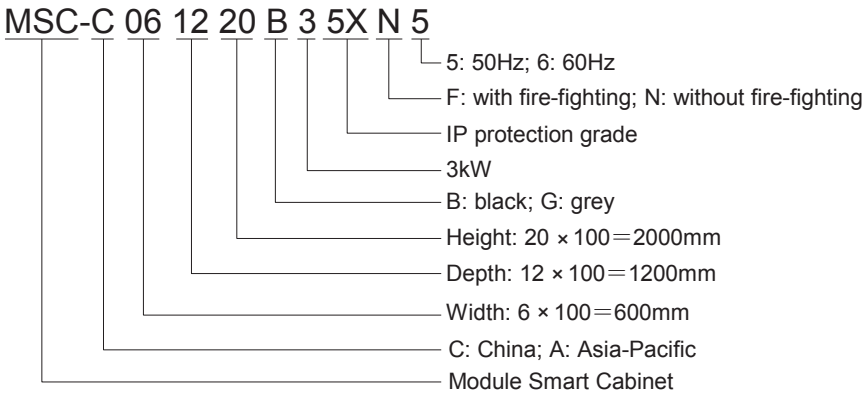

MSC-C 06 12 20 B 3 5X N 5
5: 50Hz; 6: 60Hz
F: with fire-fighting; N: without fire-fighting
IP protection grade
3kW
B: black; G: grey
Height: 20 × 100＝2000mm
Depth: 12 × 100＝1200mm
Width: 6 × 100＝600mm
C: China; A: Asia-Pacific
Module Smart Cabinet

Figure 1-1 Model description

1.2 Product Name And Model

See Table for the product name and model.

Table 1-1 Product name and model

No.	Product name	Product internal model	Product external model
1	SmartCabinet	MSC-C061220B35XN5	MSC-C061220B35XN5
2	SmartCabinet	MSC-A061220B35XN6	MSC-A061220B35XN6
3	SmartCabinet	MSC-A061220B35XN5	MSC-A061220B35XN5

1.3 Specifications

See Table 1-1 for the detailed specification of the SmartCabinet.

Table 1-2 Specification of SmartCabinet

Parameter	Specification	Note
Cabinet dimension (Width × Depth × Height, mm)	600 × 1200 × 2000	
Available height of equipment installation (1U = 44.45mm)	29U	Without fire-fighting
	26U	With fire-fighting
Mounting depth of equipment (mm)	721.5	
IT device power (W)	≤ 3KW	Max. power: 3kW
Voltage (Vac)	Single-phase, 198Vac ~ 254Vac	
Frequency (Hz)	50/60	60Hz is available for Asia-Pacific version
Closed mode	cold and hot aisles	
Color	RAL7021	
System protection grade	IP5X	
Weight	< 300kg	
Noise	< 50dB*	Excluding outdoor unit of air conditioner and user loads
Note*: Higher than Class 1 area diurnal level in environmental quality standard for noise (GB3096-2008)		

1.4 Features

SmartCabinet has the following features:

- Dust-proof and noise reduction, high efficiency and energy saving: totally enclosed operation and internal cycle system ensure purity, temperature and humidity inside the cabinet, to prolong the lifetime of IT devices. A high efficient UPS dedicated for computer room is used, and a precision air conditioner (AC for short) cooperates with closed cold / hot aisle technology to improve purposeful cooling in computer room. The fan is embedded with mute design, which can be used in office area.
- Intelligent monitoring: intelligent control functions such as integrated environment monitoring, device monitoring, alarm linkage and so on provide centralized monitoring platform for computer room management.
- Highly-integrated and space saving: one standard cabinet provides stable operating conditions for all IT devices, only cabinet connection and installing air conditioner are needed in user field. The system only occupies 0.7m^2, which is compact and beauty.
- Friendly HMI and unattended operation: large 7” LCD wide screen display serves you to know the device operation / alarm / safety information. Through the monitoring card embedded in the cabinet, you can realize all day remote monitoring on the mini computer room, to satisfy different occasion application.
- Quick delivery and secure brand: settled at one go, built in one hour, started up during one day, all in Emerson, brand trust with no worry.

1.5 Appearance And Components

The system composition of the SmartCabinet is shown in Figure 1-2; the appearance and components are shown in Figure 1-3.

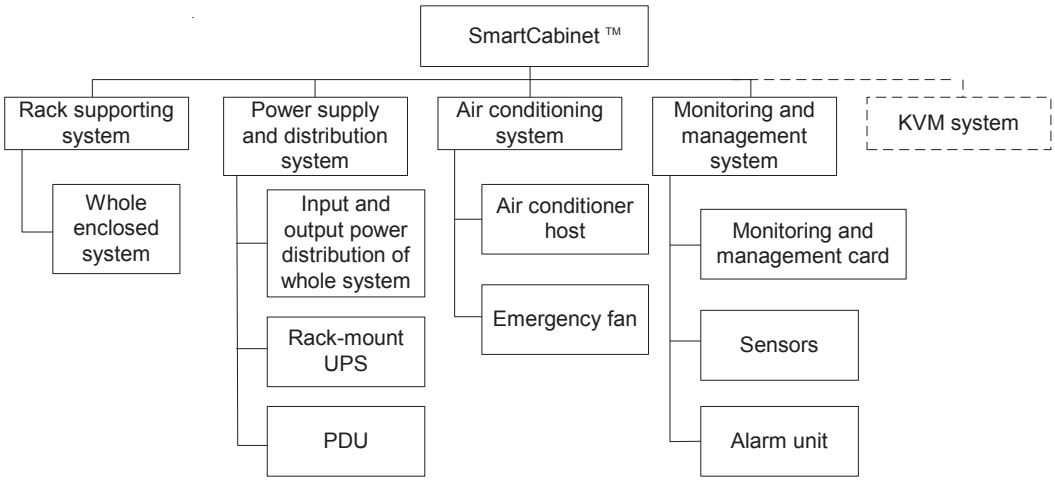


Figure 1-2 Schematic diagram of system composition

Figure 1-3 Appearance and components

1.6 Functional Components

The SmartCabinet mainly contains rack supporting system, power supply and distribution system, air conditioning system, monitoring and management system, as given in Table 1-3.

Table 1-3 SmartCabinet system function

System type	Component	Main function	Feature
Rack supporting system	/	Used to store the 19'' rack mount hardware equipment which complies with the industry-standard (EIA-310-D) such as server, voice, data, Internet network equipment, UPS and so on	The whole cabinet system is totally enclosed when operating, to keep the system clean without dust, which can save energy and reduce noise
Power supply and distribution system	PMU (power management unit)	Power distribution, surge suppression	Centralized management over power supply and distribution of the whole system, Class C lightning protection, one-route input and multiple-route output control function, convenient operation and easy use
	UPS and battery	Power supply	Providing high quality and high availability electric energy input for IT devices
	PDU	Power distribution	Configured with Switch model PDU, which can turn on/off output ports intelligently and detect input and output electric quantity parameters
	LED lamp	System auxiliary lighting	Safe and energy-saving
Air conditioning system,	Air conditioner	Cooling the electronic devices inside the cabinet actively	Small-sized precision environmental control system, using advanced frequency conversion technology, specially designed for the cooling of electronic devices, with high energy efficiency ratio and automatic adjustment, keeping the environment in the cabinet to be stable so that the IT devices can operate safely and reliably
	Emergency ventilation system	Prevent high temperature partially inside the cabinet	An emergency device that can start up automatically when over temperature occurs inside the cabinet or the air conditioner shuts down or fails, to prevent the devices from operating in high temperature. When the system is operating normally, the emergency ventilation kit is off, to ensure airtight environment in the system and high efficiency cooling of the air conditioner
Monitoring and management system	MSC-C	System monitoring core	A kind of intelligent management system which provides power inside the cabinet and environmental monitoring, supportive of plug-and-play of Emerson intelligent sensors, providing alarm notification of various types of devices and environmental status, providing integrated Web page visit function, local display and control function for the user
	LCD display panel	Local display and control function	
	Sensors	Environmental and door status collecting	

1.7 Ambient Requirements

1.7.1 Operation Environment

The operation environment requirements are listed in Table 1-4.

Table 1-4 Operating condition

Item	Requirement
Installation position	Make sure that the installtion field is level. Max. equivalent horizontal distance between the indoor unit and the outdoor unit of the AC: 20m, Vertical distance Δ H: -5m ≤ Δ H ≤ 10m
Installation field	In computer room or office area. The distance from the front / rear door to the wall or other obstacles is larger than 1.0m
Ambient temperature	Indoor*: 0°C ~ 40°C Outdoor unit of air conditioner: standard model, -15°C ~ +45°C

Item	Requirement
Ambient humidity	30%RH ~ 95%RH (when the whole unit is operating in high temperature and high humidity environment, condensing water may appear on the external surface of front glass door and the display panel
Altitude	For the UPS, the altitude is required to be: < 1500m, derating is required when the altitude is above 1500m with reference to GB/T3859.2; For the air conditioner, derating is required when the altitude is above 1000m
Operation voltage range	Single-phase, 198Vac ~ 254Vac
Note*: When the ambient temperature of the cabinet exceeds 35°C, the cabinet loads should be derated to below 2800W	

1.7.2 Storage Environment

The storage environment requirements are listed in Table 1-5.

Table 1-5 Operation environment requirements

Item	Requirement
Storage environment	Indoor, clean without dust
Ambient humiduty	5%RH ~ 95%RH (Non-condensing)
Ambient temperature	-30°C ~ + 70°C

Chapter 2 Preliminary Before Installation

This chapter expands the preparation before installing the SmartCabinet, including installation tools, fittings, accessories, conveying, unpacking, inspection, installation safety instructions, and computer room requirement.

Note

1. The components of SmartCabinet are large and heavy. Therefore, the risk of collapse exists, improper operation may cause physical injury or death, and damage to the equipment.

2. The center of gravity of SmartCabinet is forward-inclined, during conveying process, note to adjust the bearing position of the forklift or the hand pallet truck.

3. Read all the following operation guides before attempting to move, put up the components or unpack the package.

4. The sharp edge, object sharp angle and bare buckle can result in physical injury. Only trained personnel who wear proper safety helmet, gloves, shoes and glasses can move and put up the components, remove the package or prepare to install.

5. The cabinet maybe too high to go through the door together with the pallet. To avoid damage to the equipment and the building, measure the height of the cabinet and the door, and confirm the clearance before moving it.

2.1 Installation Tools

Floating nut hook

The floating nut hook is an accessory; its appearance is shown in Figure 2-1.

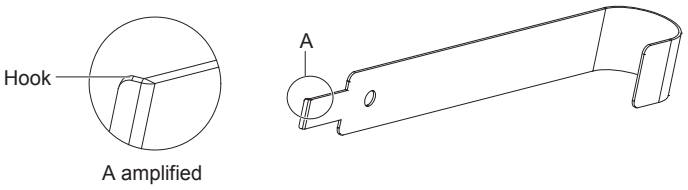


Figure 2-1 Floating nut hook

The floating nut hook is used to install the floating nut; the installation method is as follows:

1. Insert one fastener of the floating nut into the square hole of the vertical mounting rails, as shown in Figure 2-2.

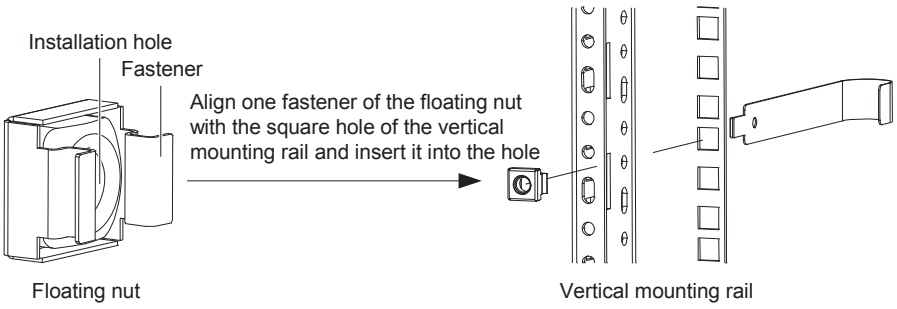

Installation hole
Fastener
Align one fastener of the floating nut with the square hole of the vertical mounting rail and insert it into the hole
Floating nut
Vertical mounting rail

Figure 2-2 Schematic diagram 1 for installing floating nut

Note

The floating nut should be inserted into the square hole in horizontal direction, that is, the fasteners on both sides of the floating nut should touch the left and right sides of the square hole. The fasteners should not touch the top and bottom of the square hole.

2. Lead the floating nut hook through the square hole, hitch the other fastener of the floating nut and pull it out to fix the fastener to the square hole completely, as shown in Figure 2-3.

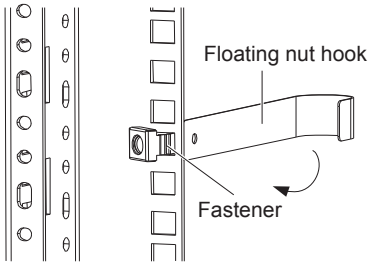


Figure 2-3 Schematic diagram 2 for installing floating nut

Other installation tools

Other installation tools are shown in Figure 2-4. See Table 2-1 for their usage.

Figure 2-4 Other installation tools

Table 2-1 Usage of other installation tools

Name	Usage
Utility knife	Disassemble the package
Cross head screwdriver	Tighten the screws when assembling the components. Recommended size: 1 × 300
Movable wrench	Adjust the feet. Recommended size: 250mm × 30mm (length × max. hatch width)
Gradienter	Display the level state when adjusting the cabinet
Vacuum pump	Used for pipe vacuum during AC installation process

2.2 Fittings

The fittings are shown in Figure 2-5; See Table 2-2 for their usage.

Figure 2-5 Fittings

Table 2-2 Usage of fittings

Name	Usage
Floating nut	Use together with M6 screw, used to install the parts in the cabinet
M5 countersunk head screw	Used to install the cabinet connector
M6 panel screw	Used to install the power distribution unit, monitoring system and user equipment
M6 pan head screw	Used to connect and fix the frame
M6 flange nut	Use together with M6 pan head screw, used to install the L fastener
Adhesive tape	Used to seal the gap between the connected frames
Cable tie fixture kit	Used to fix and bind the cables

2.3 Accessories

See Table 2-3 for the accessories.

Table 2-3 Accessories

No.	Product name	Quantity	Note
1	Cable tie	30	Accessory box 1
2	Cable tie fixture	10	
3	OT terminal	4	
4	Floating nuts, M6 panel screw	30 (set)	
5	Floating nut hook	1	
6	MSC-C card	1 (set)	
7	Hairbrush	1	
8	Dummy plate	1 (set)	
9	Copper pipe	2	Accessory box 2
10	Sealing glue	1	
11	Copper pipe binding strip	1	

2.4 Conveying, Unpacking And Inspection

Transportation

It is recommended to choose railway or ship for transporting the cabinet, AC indoor unit and AC outdoor unit. If truck transportation is chosen, choose preferable roads to avoid excess bumping.

The component with package is shown in Figure 2-6. See Table 2-4 for its ranges of dimensions and weight.

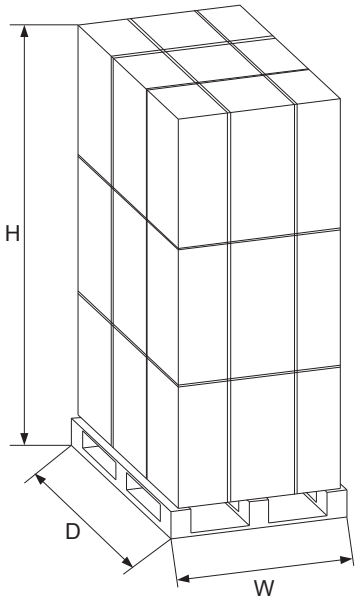


Figure 2-6 Component with package

Table 2-4 Ranges of dimensions and weight

Component	Range of dimensions (Unit: mm)			Range of weight (Unit: kg)
	H	W	D	
Cabinet component with package	2150	720	1400	< 300kg

There are two accessory boxes (placed in the cabinet for delivery) of the same structure and dimensions, as shown in Figure 2-7. See Table 2-5 for the dimensions and weight.

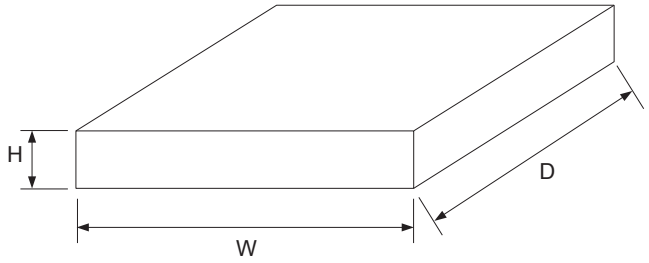


Figure 2-7 Accessory box

Table 2-5 Ranges of dimensions and weight

Range of dimensions (Unit: mm)			Range of weight (Unit: kg)
H	W	D	
90	530	710	< 15kg

Carrying

The user needs to carry the cabinets, closed frames and AC indoor unit to the nearest place to the installing site. Because they are heavy, it is recommended to use mechanical carrying tools to unload and carry them, such as a hand pallet truck or an electrical forklift, as shown in Figure 2-8.

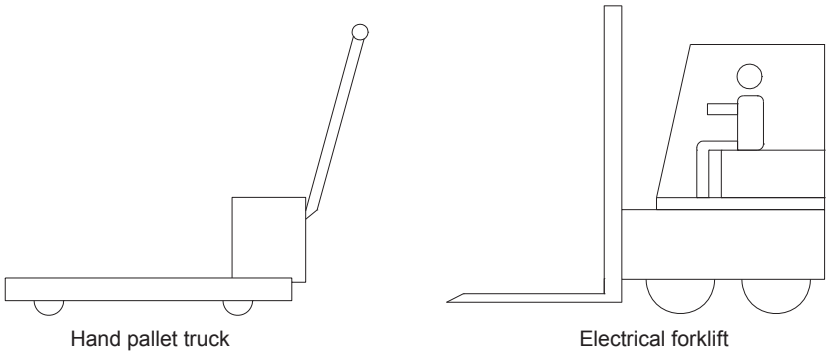


Figure 2-8 Mechanical carrying tools

When the hand pallet truck or the electrical forklift is used to unload and carry them, it is recommended to forklift them on its center of gravity to avoid toppling over, as shown in Figure 2-9.

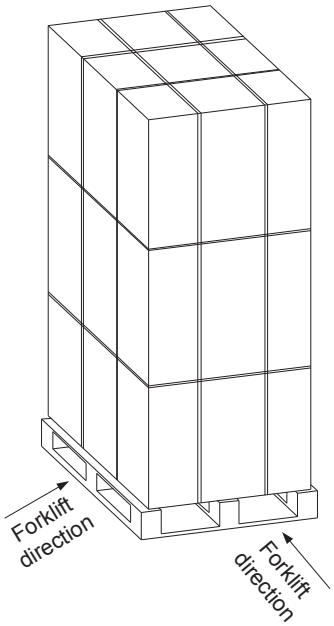


Figure 2-9 Forklift direction

When carrying the components, maintain the obliquity in range of 80° ~ 100°. Excess inclination is forbidden, as shown in Figure 2-10.

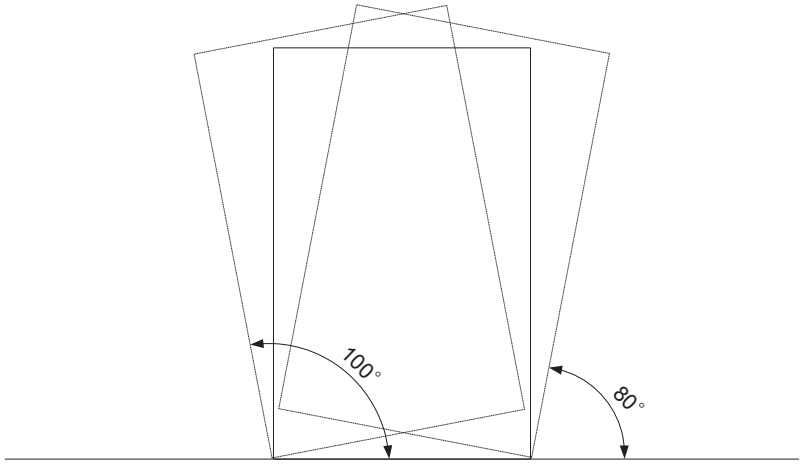


Figure 2-10 Carrying obliquity

Note

1. Ensure that the equipment stands upright. Do not place the equipment outdoors.

2. When using the hand pallet truck or the electrical forklift, ensure that the fork arms (if adjustable) open to the utmost extent; therefore the fork arms can be placed under the pallet of the equipment precisely. Besides, ensure that the length of the fork arms matches with that of the equipment.

Packing materials

All the packing materials of the cabinet are recyclable. Retain the packing materials for further use or dispose of them properly.

Unpacking

Move the equipment to the nearest place to the final installing site, and then unpack it.

The unpacking procedures are as follows:

1. Remove the packing materials

1) Move the equipment of assembled package to an open, firm and level ground.

2) Use a utility knife to cut off the packing strip on the package paper box carefully and remove the package paper box of the cabinet.

3) Use a utility knife to remove the extension film on the cabinet and the bagging package materials.

2. Remove the feet pressure plate

Use a sleeve or a moveable wrench to remove the fixing screws on the pallet, and remove the pressure plate, as shown in Figure 2-11.

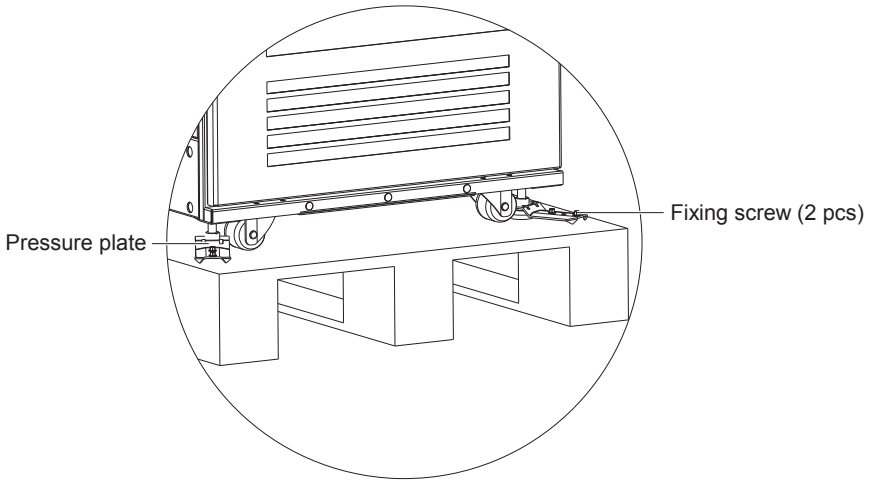


Figure 2-11 Removing the feet pressure plate

3. Remove the pallet

1) Loosen the fixing nuts on the four feet bolts to raise the feet, and the four castors will bear the weight, refer to *3.1 Installing Cabinet Components*.

2) Place a slope in front of the front or rear door, and connect it with the pallet, as shown in Figure 2-1.

3) Push the cabinet slowly from the pallet down to the ground along the slope.

4) Place the cabinet on the preserved position, and adjust the feet fixing nuts till the cabinet is level.

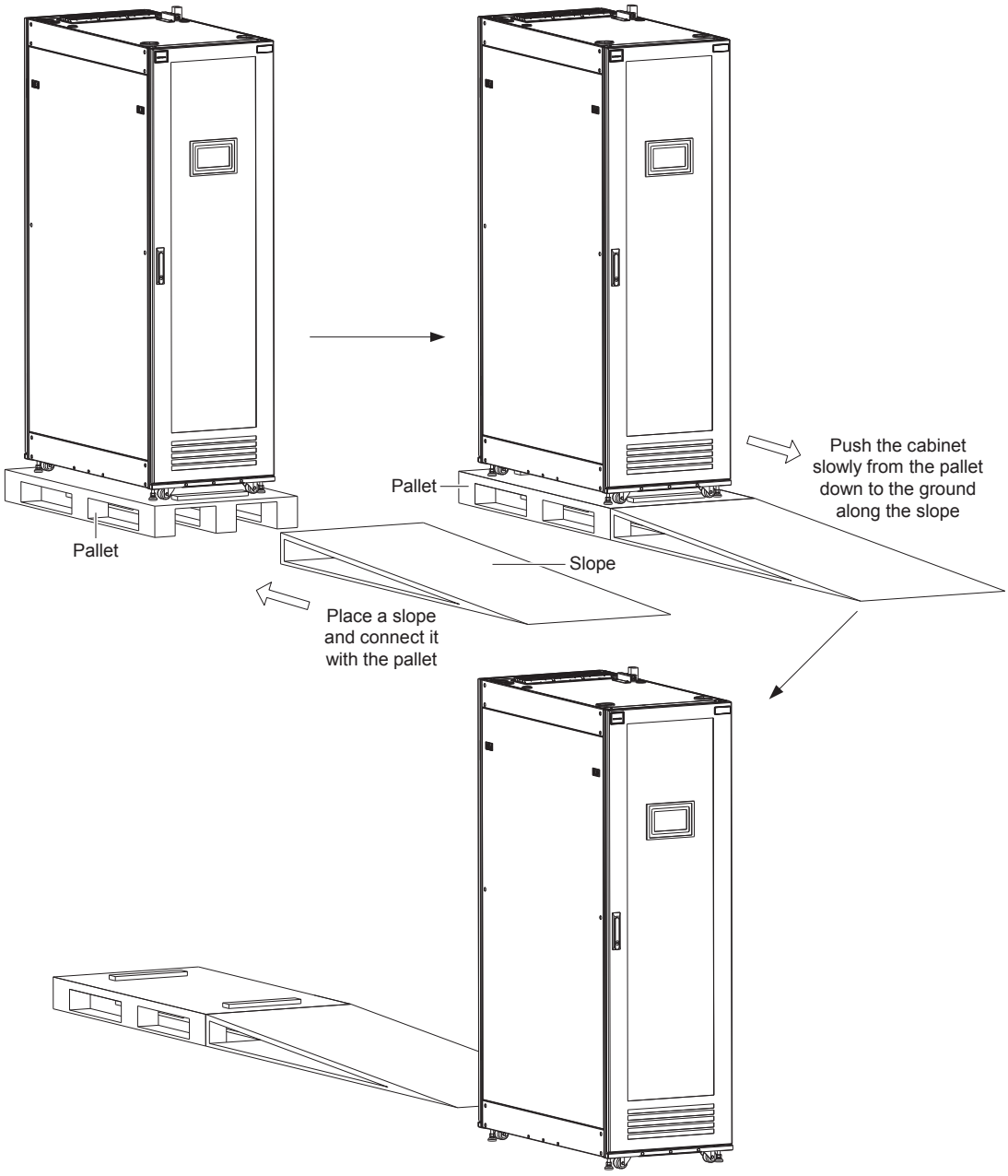

Pallet
Pallet
Push the cabinet slowly from the pallet down to the ground along the slope
Slope
Place a slope and connect it with the pallet

Figure 2-12 Removing the pallet

Note

1. When removing the pallet, you need to prepare the slope or similar device by yourself.

2. The whole cabinet is very heavy, so take precautions when pushing the cabinet from the pallet down to the ground along the slope, to avoid accidental collapse.

Inspection

After unpacking the components, verify that all the accessories are included according to the packing list and there is no apparent damage on the components. If any component is absent or damaged, report to the carrier immediately. If any covert damage is found, report to the carrier and the local service center of the supplier.

2.5 Installation Safety Instructions

The installation safety instructions of the SmartCabinet are as follows:

1. Close all the doors when lifting the equipment by an electrical forklift;

2. Before installation, ensure that the installing site is plane;

3. Switch off the power during the installation. Operation on electrified equipment is forbidden. The connecting cable must comply with related requirements;

4. Pay attention to the installation requirements of the indoor and outdoor unit when installing the AC.

2.6 Requirements On Datacenter Or Computer Room

Environment

The installation site of the SmartCabinet should be far away from any source of heat and sparkle. Avoid direct sunlight. The computer room should be free of corrosive gas and organic solvent.

Clearance

When installation, maintain sufficient clearance to facilitate installation and maintenance of the cabinet. The distance from the front / rear door to the wall or other obstacles must be larger than 1.0m. The required clearance for opening the front and rear door is shown in Figure 2-13.

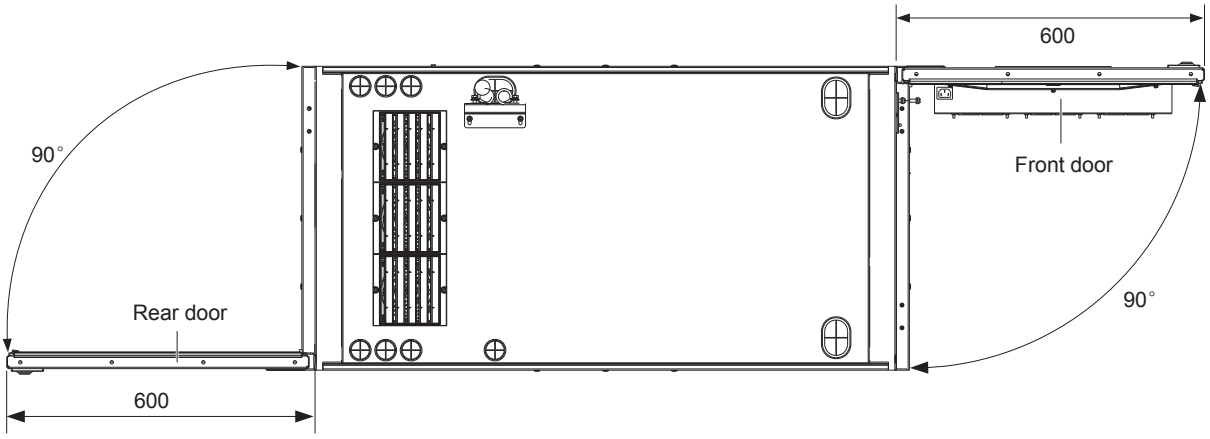


Figure 2-13 Required clearance for opening the front and rear door (Top view, unit: mm)

Weight-bearing capacity

After user equipment is installed, the SmartCabinet is heavy, so you should consider the weight-bearing capacity of the floor of the computer room. The cabinet body of SmartCabinet is 300kg, occupying 0.72m^2. During actual engineering installation, you need to estimate the weight-bearing capacity of the floor according to the total weight including the installed equipment. If you cannot estimate the weight-bearing capacity, please consult the nearest Emerson office or customer service center.

Chapter 3 Installation

This chapter introduces the installation and commissioning of the SmartCabinet. Ensure that all the installation tools and fittings are at hand before installation, and perform operation according to the content in this chapter.

The flow chart of installation is shown in Figure 3-1.

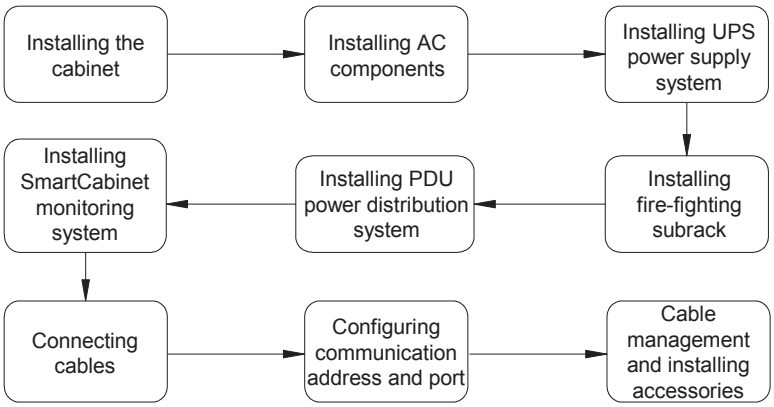


Figure 3-1 Flow chart of installation

3.1 Installing The Cabinet

1. Place the cabinet on the prearranged position, and use a movable wrench to loosen the fixing nuts on the four feet bolts on the cabinet, as shown in Figure 3-2.

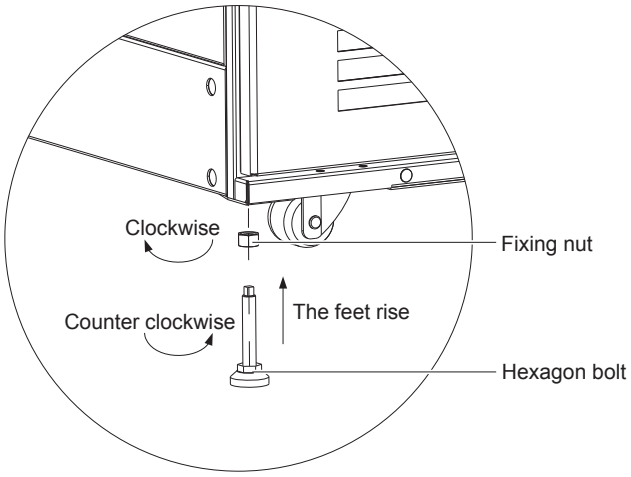


Figure 3-2 Loosening the fixing nut

2. Rotate the hexagon head bolt on the bottom of the feet clockwise or counter clockwise till the feet rise or drop to an optimal position, and use a gradienter to ensure that the cabinet is horizontal.

3. Tighten the fixing nuts (shown in Figure 3-2) on the feet bolts counter clockwise, and the cabinet adjustment is completed.

3.2 Installing AC Components

The AC components comprise AC indoor unit, and AC outdoor unit. When delivery, the AC indoor unit has been installed in the cabinet before delivery, the AC outdoor unit is placed inside the cabinet and delivered with the cabinet. In field, you need to place the AC outdoor unit reasonably, connect copper pipes between the AC indoor unit and outdoor unit, vacuum and connect cables.

3.2.1 Removing And Placing Outdoor Unit

1. Remove the four screws on the press strips of outdoor unit, and remove the two press strips, as shown in Figure 3-3.

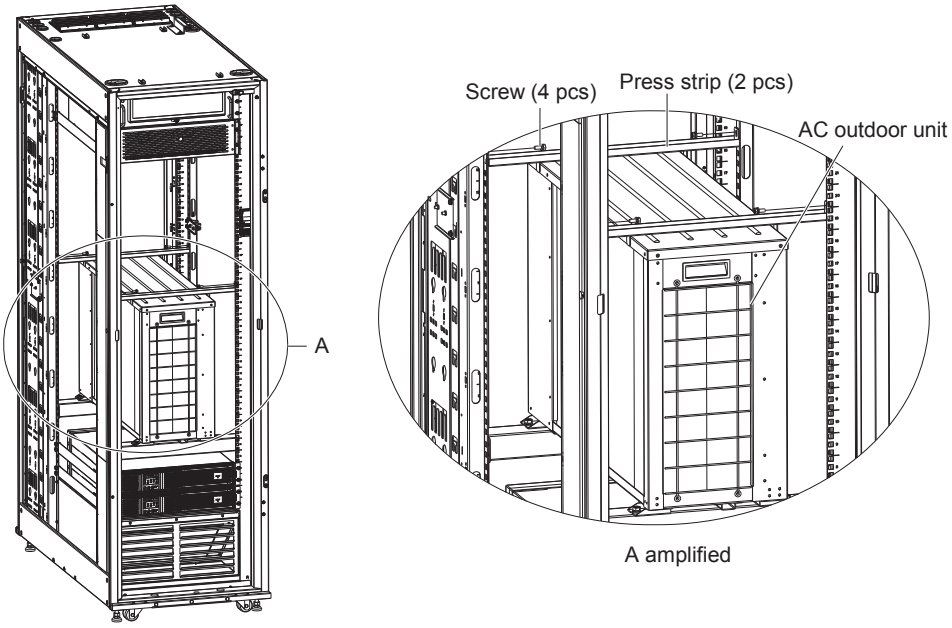


Figure 3-3 Removing the press strips of outdoor unit

2. Remove the four screws on the four corners of outdoor unit, and carry the AC outdoor unit out, as shown in Figure 3-4.

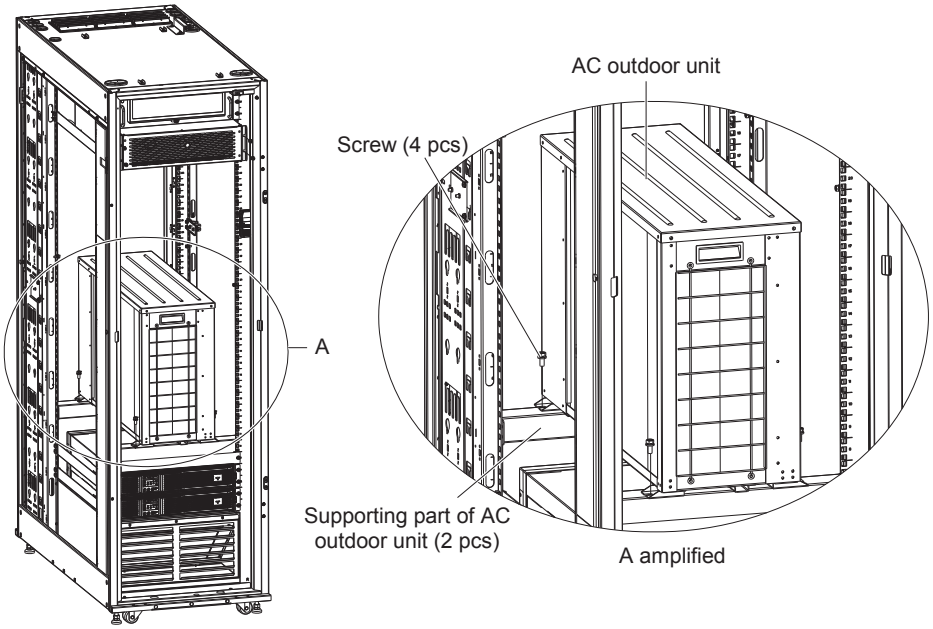


Figure 3-4 Removing the fixing screws of outdoor unit

Note

1. In Figure 3-3, the two metal press strips on top of the outdoor unit can be used as horizontal cable organizers at back end of the cabinet.

2. In Figure 3-4, the two 1U-height supporting part of AC outdoor unit at lower part of the outdoor unit can be used as dummy plates in cold aisle of the cabinet.

3.2.2 Installing AC Outdoor Unit

The AC outdoor unit must be vertically installed. There are two conditions in actual installation: outdoor unit installed higher than indoor unit and outdoor unit installed lower than indoor unit, as shown in Figure 3-5 and Figure 3-6.

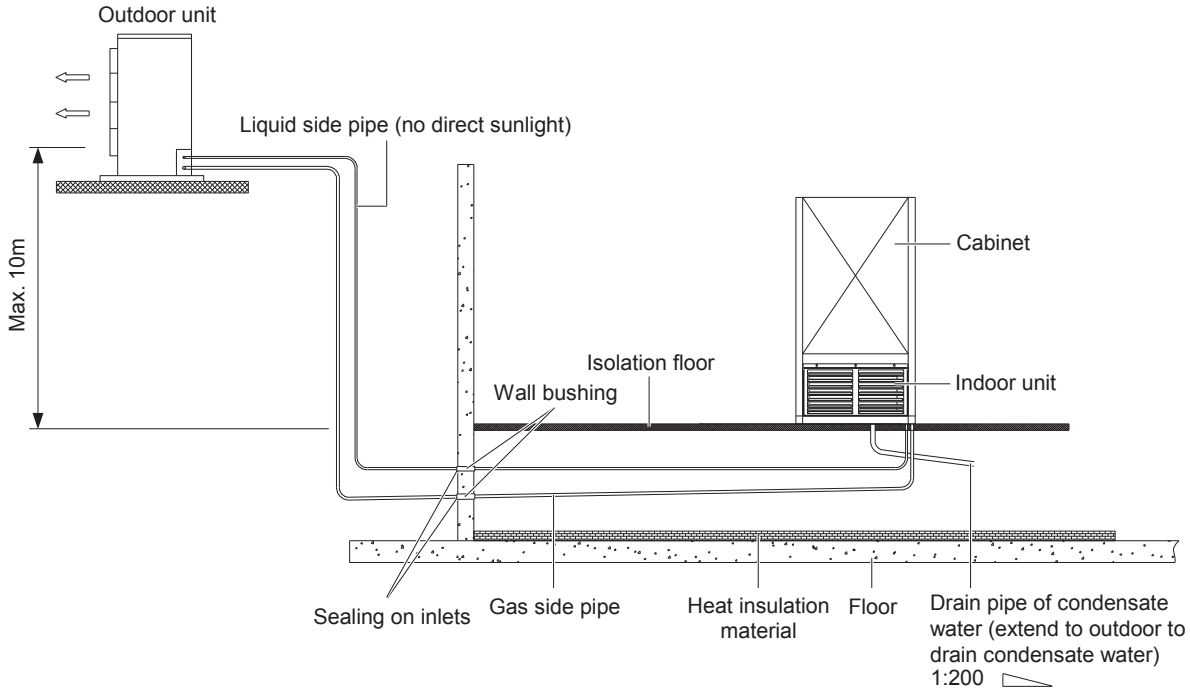


Figure 3-5 Outdoor unit installed higher than indoor unit

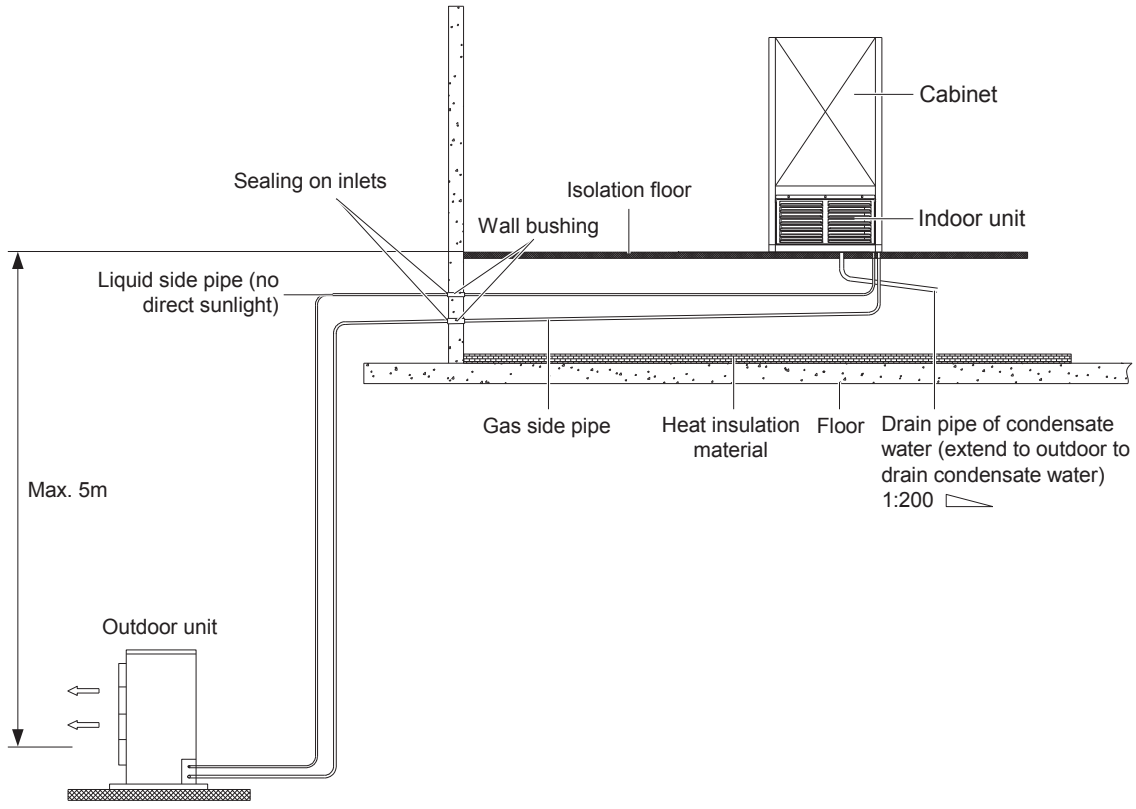


Figure 3-6 Outdoor unit installed lower than indoor unit

1. Regular installation of outdoor unit

1) Place the outdoor unit on the base, as shown in Figure 3-7.

2) Use expansion bolts to fix the outdoor unit on the base.

If there are multiple outdoor units that need to be placed with one above the other, follow the method shown in Figure 3-7 to install them.

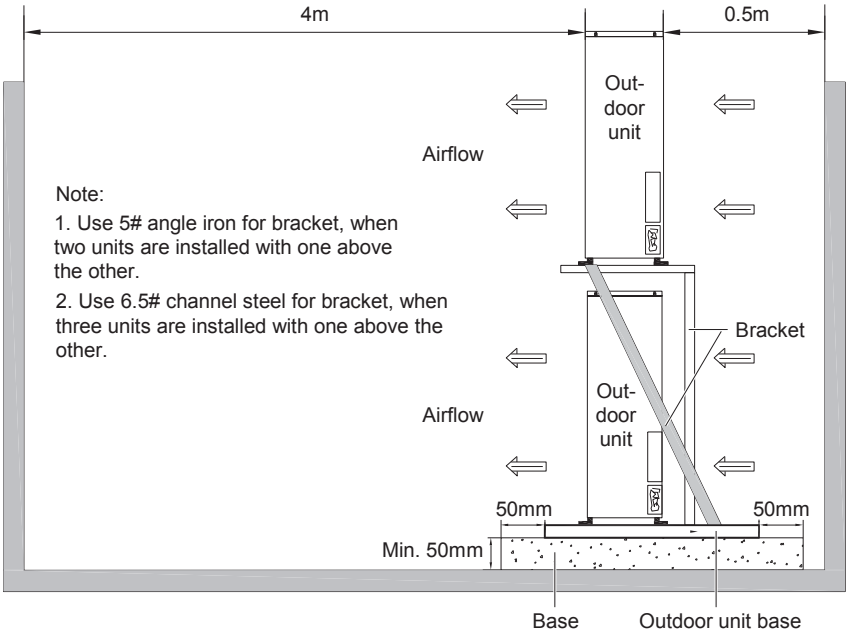


Figure 3-7 Installing multiple outdoor units with one above the other

2. Installing the outdoor unit on top of the cabinet

There is a special method for installing outdoor unit higher than indoor unit, that is, installing the outdoor unit on top of the cabinet. The detailed installing procedures are as follows:

1) Life or carry the outdoor unit removed from the cabinet onto top of the cabinet. See Figure 3-8 for the installing direction of AC outdoor unit.

2) Adjust the placing position of the AC to align the AC foot stands with the corresponding screw holes on top of the cabinet, and then place metal press pieces on the foot stands, at last, use four screws to fix the AC outdoor unit on the top plate of the cabinet, as shown in Figure 3-8.

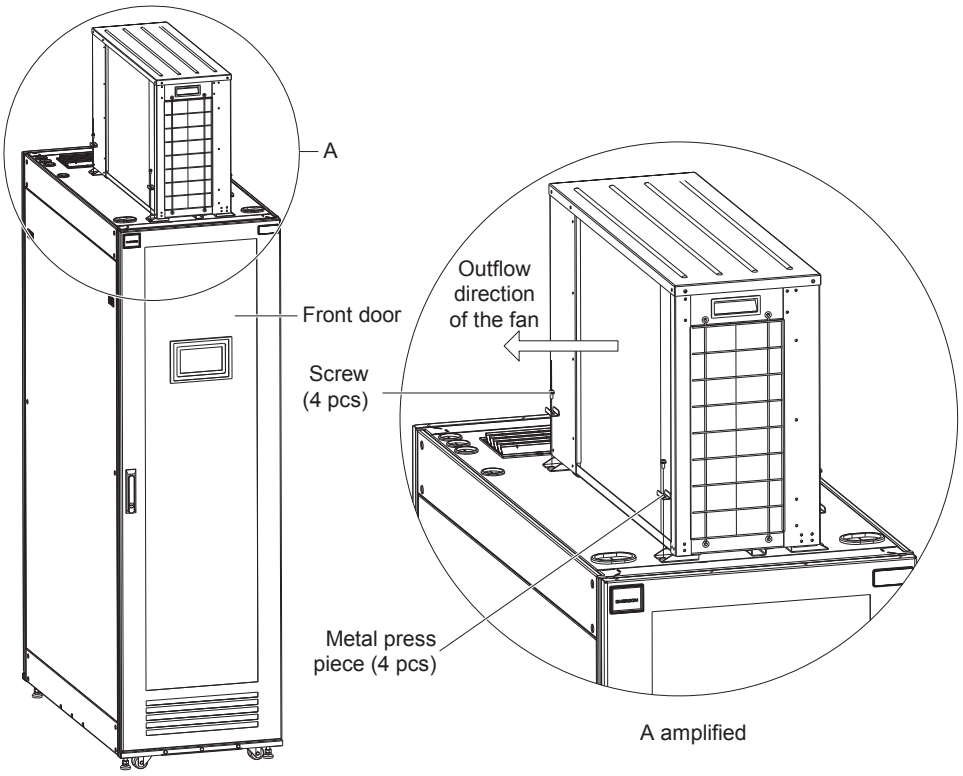


Figure 3-8 Installing outdoor unit on top of the cabinet

Note

1. The outdoor unit should be installed in a safe place easy for maintenance. Do not install it on the bottom floor of public site. It must be far away from residential area.

2. It is inappropriate to place the outdoor unit in environmental which has high requirement on noise.

3. To ensure cooling effect, the outdoor unit should be place in a clean place, free of dust and foreign matters, to avoid blocking the heat exchanger.

4. The outdoor unit cannot be placed in the neighborhood of steam, hot gas and exhaust gas.

5. Keep a distance of above 450mm between the outdoor unit and the wall, obstacles or adjacent devices.

6. The outdoor unit cannot be placed in places where snow may accumulate in the air intake side and the air outlet side.

7. It is necessary to prepare a base which can bear the weight of the outdoor unit. The base should be at least 50mm higher than the ground around, and 50mm wider than the outdoor unit base (see Figure 3-7).

8. The outdoor unit is about 43kg. When removing it from the cabinet and lift it onto the top of the cabinet, avoid personal injury and device damage.

3.2.3 Connecting Copper Pipes

1. General Principles

1) Use copper pipes with quick thread connector to connect the indoor unit and the outdoor unit. If the pipe length exceeds the standard pipe length (see Table 3-1) and straight copper pipe is used, piping joints must be brazed.

2) Follow standard industry procedures in selection and placement of pipe, system evacuation and charging with refrigerant (only when pipeline is too long). The standard refrigerant of the AC unit is R410A, and the charging amount is 1.2kg.

3) Give considerations to pipeline pressure drop, oil return to the compressor, to avoid oil leakage and clogging in parts of the system and minimize noise and vibration to the greatest extend.

4) Consult Emerson before installation on whether measures such as using extended piping kit are needed, if the equivalent length exceeds 20m, or if the vertical distance between the indoor unit and the outdoor unit exceeds the values in Table 3-1.

Table 3-1 Vertical distance between indoor unit and outdoor unit

Relative position	Value
Outdoor unit installed higher than indoor unit	Maximum: 10m
Outdoor unit installed lower than indoor unit	Maximum: 5m

5) The equivalent length of each part is given in Table 3-2. The resistance loss caused by elbows and valves has been taken into consideration. The installer should confirm if these values are appropriate for site conditions.

Table 3-2 Equivalent length of each part

Liquid pipe OD (inch)	Equivalent length (m)		
	90° elbow	45° elbow	T-type three way
1/4	0.21	0.10	0.76
1/2	0.24	0.12	0.76

2. Installation notes of connector

Top piping and bottom piping are both OK for the AC of the SmartCabinet system (For bottom piping, loosen the connectors that connect the pre-installed pipes in the cabinet and the indoor unit). The connectors of the unit are located on the AC indoor unit and outdoor unit and on top of the cabinet. Be careful when connecting the quick thread connector. Read through the following steps before making connection.

1) Remove the dust-proof caps.

2) Carefully wipe coupling seats and threaded surface with a clean cloth.

3) Lubricate the male thread with refrigerant oil.

4) Thread the coupling halves together by hand to ensure that the threads mate properly.

5) Tighten the coupling body’s hexagon nut and union valve until a definite resistance is felt.

6) Use a marking pen to draw a line lengthwise from the coupling union nut to the bulkhead. Tighten the nuts an additional quarter turn with two wrenches. The misalignment of the lines shows how much the coupling has been

tightened. The final quarter turn is necessary to ensure that the joint does not leak. Two wrenches must be used to cooperate with each other during connection, because one wrench can damage the coupling copper lines easily.

The recommended torque values are listed in Table 3-3.

Table 3-3 Recommended torque value

Coupling size	Torque value (N·m)
1/4”	6 ~ 7
1/2”	8 ~ 9

3. Required Pipe Connections

Refrigerant pipe between the indoor unit and the outdoor unit (discharge pipe and liquid pipe)

1) The copper pipes provided by the factory are 5m. If longer pipes are required, contact Emerson or your sale agency.

2) The liquid pipe is the refrigerant liquid pipe of the outdoor unit outlet. So a reasonable pipe diameter and length should be selected for the liquid pipe to ensure that the pressure drop of the refrigerant liquid through the pipe during unit operation does not exceed 40kPa (5psi ~ 6psi).

3) The pipe should be installed and removed with care so that they will not get kinked or damaged. Use tube benders and make all bends before making connections to either end.

4) If jointing mode is needed, all refrigerant piping should be connected with silver-brazed joints.

5) Check piping supports, leakage testing, dehydration of refrigerant pipes and evacuation before using. Use vibration isolating support to isolate the refrigeration pipes from the building.

6) Use a soft and flexible material to pack around the pipes to protect them from damage caused by going through openings in walls and to reduce vibration transmission.

7) Connect pipes of indoor and outdoor units according to the labels. The unit uses quick connection mode.

8) Adding refrigerant for long pipe system

The AC has been charged with appropriate refrigerant before delivery. If the connecting pipe between the indoor unit and the outdoor unit is longer than 5m, add refrigerant to the system in order to ensure normal system operation according to the following formula.

Adding refrigerant amount (kg) = adding refrigerant amount per meter of liquid pipe (kg/m) × total length of extended liquid pipe (m)

See Table 3-4 for the adding refrigerant amount per meter of liquid pipe.

Total length of extended liquid pipe (m) = total length of liquid pipe (m) - 5m

Table 3-4 Adding refrigerant amount per meter of liquid pipes with different ODs

Liquid pipe OD (inch)	Adding refrigerant amount per meter (kg/m)
1/4	0.040

3.2.4 Connecting Drain Pipe Of Indoor Unit

The indoor unit drains water to the tray inside the cabinet directly. The condensate water flows to the drainage channel or outdoor along the drain pipe on the bottom of the cabinet, as shown in Figure 3-9. The standard length of the drain pipe is 5m. The drain pipe cannot be placed on frozen places, and it must be laid on the ground closely, moreover, the pipe cannot be higher than the tray outlet.

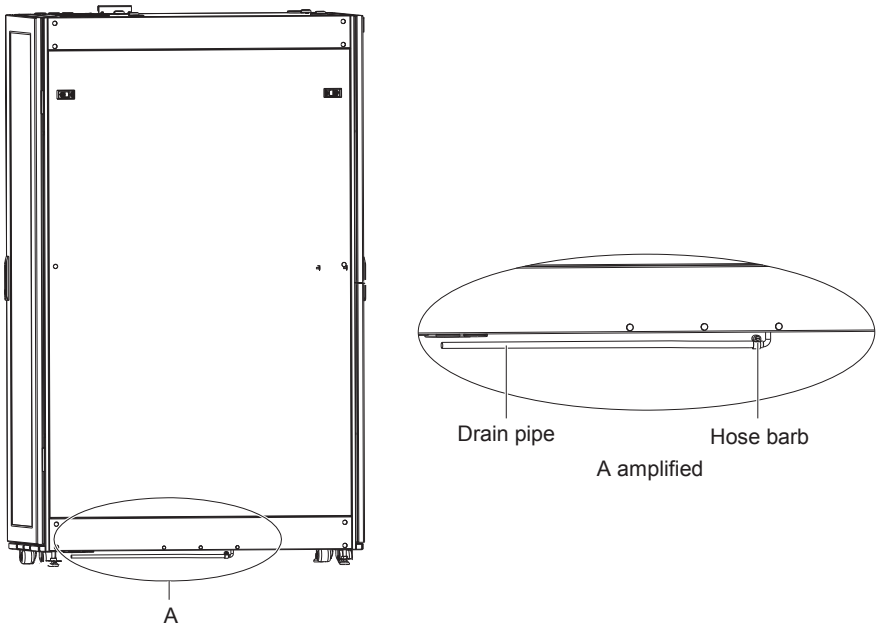


Figure 3-9 Condensate water pipe location

Note

1. The AC refrigerant is R410A. The low quality or counterfeit refrigerant will damage the system severely. Please use the refrigerant approved by Emerson Network Power Co., Ltd. For the system abnormity or damage caused by using other brands of refrigerant, the warranty will be invalid.

2. After engineering installation is finished, before start up the device, please ensure that the connected pipes are all installed without leakage. You need to apply sealant to the unit pipe outlets for sealing.

3.3 Installing UPS Power Supply System

The system is configured with Emerson ITA series 5kVA UPS and battery. The UPS is rack-mounted in the U space at lower part of the cabinet, it cooperates with the power management unit (PMU for short, it has been installed at top part of the cabinet) installed in the same cabinet to realize mains input and power supply and distribution management function. There are two versions for the UPS configured in the system: domestic version and Asia-Pacific LCD version. For Asia-Pacific version, the UPS and the battery module are installed in the SmartCabinet at factory and delivered with the cabinet; for domestic version, the UPS needs to be installed in user field. The following introduces how to install the battery and the UPS of domestic version.

3.3.1 Installing Battery Module

1. Use six M4 × 10 screws to fix two hangers (accessories) onto both sides of the front panel of the battery module, as shown in Figure 3-10.

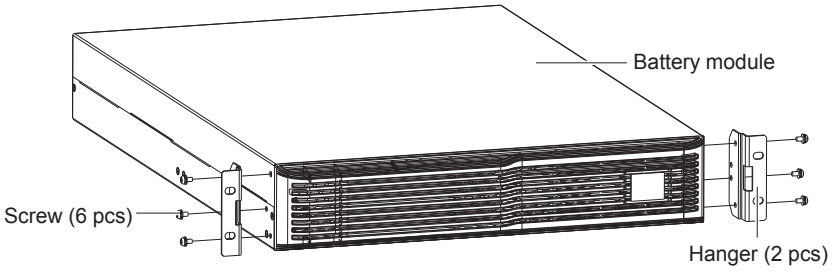


Figure 3-10 Installing brackets

2. Place the battery module on the cabinet bracket, push it in and use four M6 × 16 screws to fix it on the rack, as shown in Figure 3-11.

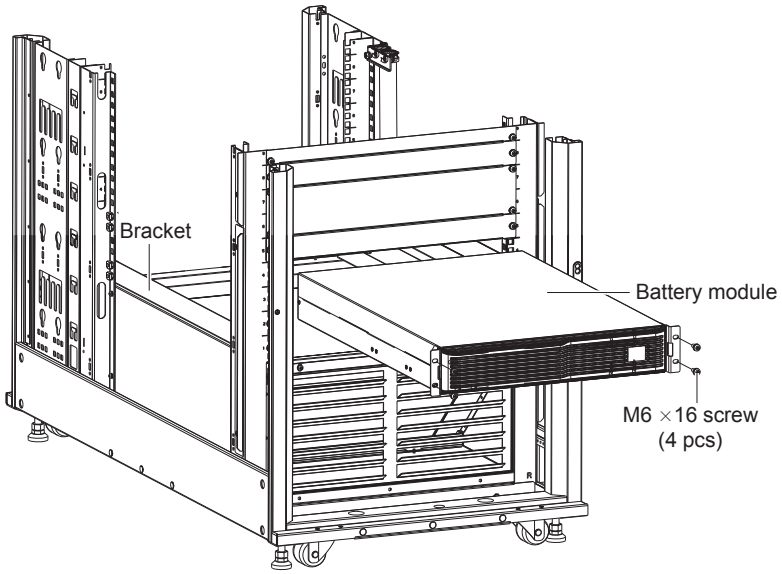


Figure 3-11 Installing battery module

3.3.2 Installing UPS

1. Use six M4 × 10 screws to fix two hangers (accessories) onto both sides of the front panel of the UPS, as shown in Figure 3-12.

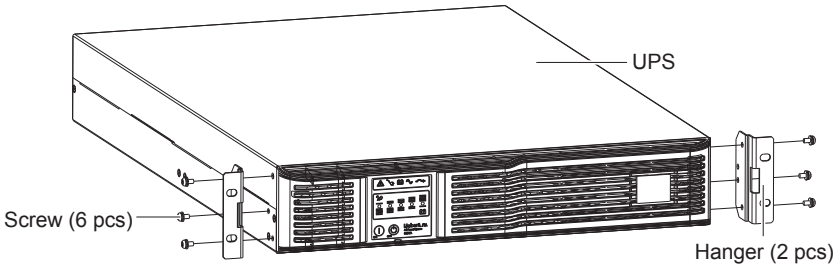


Figure 3-12 Installing brackets

2. Place the UPS on the cabinet bracket (pre-installed), push the UPS in to make the hangers align with the vertical poles. Use four M6 × 16 screws to fix the UPS on the rack through the hangers, as shown in Figure 3-13.

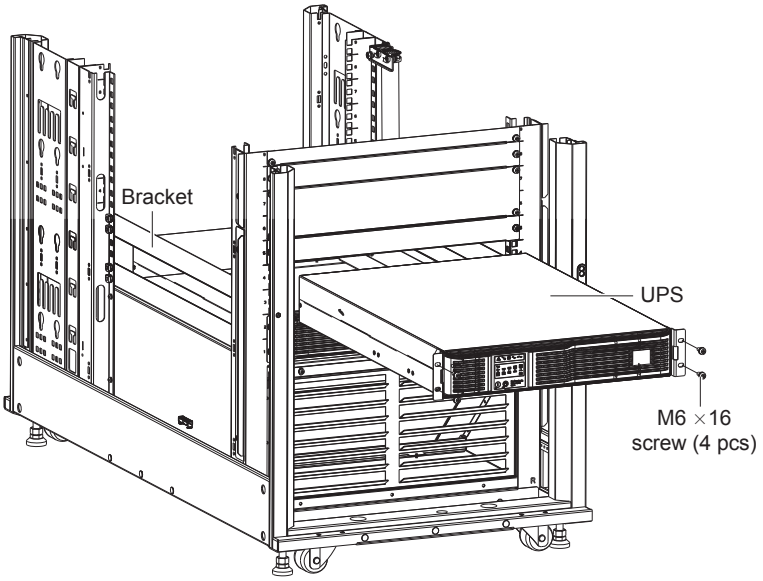


Figure 3-13 Installing UPS

Note

1. When the battery module and the UPS are installed together, install the UPS in the upper space, and install the battery module in the lower space adjacent to the UPS, to facilitate cable connection and operation.

2. For domestic-version SmartCabinet, you need to install the UPS and the battery in field; for Asia-Pacific version, the UPS and the battery have already been installed before delivery, so you do not need to install them in field.

3. For the operation of 5kVA UPS, please refer to *Liebert® ITA 5kVA UPS User Manual*.

Warning

According to the refrigerating power of the AC, the power of the heating devices inside the cabinet should not exceed 3kW. It is recommended that the user devices of large heating quantity be placed in the middle or lower part of the cabinet.

3.4 Installing Fire-Fighting Subrack (Option)

1. The fire-fighting subrack is to be installed in the 3U space under the PMU (power management unit). Place the fire-fighting subrack on the supporting rail of the cabinet.

2. Push the fire-fighting subrack in to make its hangers aligned with the vertical poles.

3. Use four M6 × 16 screws to fix the fire-fighting subrack on the rack through the hangers, as shown in Figure 3-14.

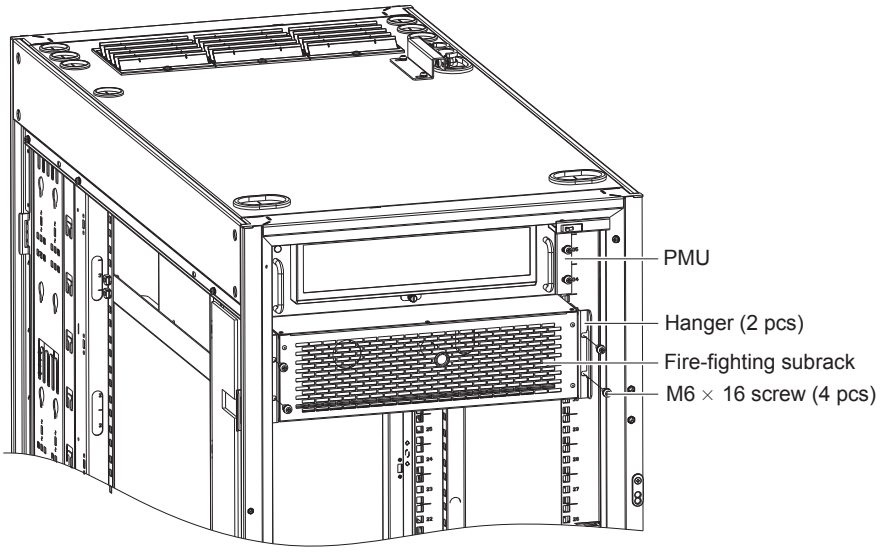


Figure 3-14 Installing fire-fighting subrack

3.5 Installing PDU Power Distribution System

The system uses Emerson MPS series PDU, which can be quickly installed on the cable organizer vertically with no tools. The PDU has been installed before delivery, so you do not need to install it in field.

1. Insert the two fixing buttons on the back of the PDU into the suitable installation holes on the cable organizer of the cabinet.

2. Press down the PDU until it is firmly clamped and locked, as shown in Figure 3-15.

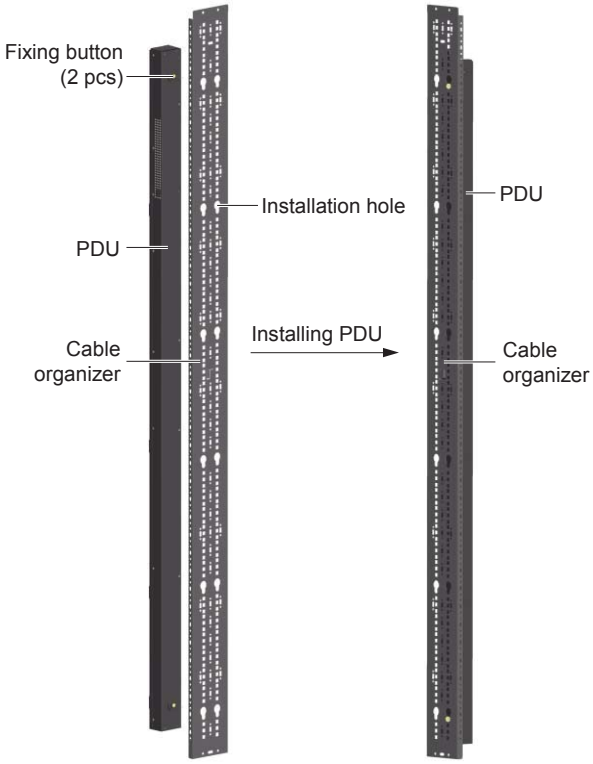


Figure 3-15 PDU tool-less installation

Note

1. When using top cabling method, make the cable outlet end of the PDU upward and vertical.

2. When removing the PDU from the cabinet, use force evenly to make the PDU slide upwards vertically until the fixing buttons are divorced from the installation hole.

3. Refer to *Liebert MPS PDU User Manual* for other installation modes.

Warning

When using the PDU, pay attention to the power distribution capacity of single PDU and the threshold current of each power distribution output port. The overload use is prohibited.

3.6 Installing SmartCabniet Monitoring System

See Table 3-5 for the configuration of the SmartCabniet monitoring system.

Table 3-5 Configuration of the SmartCabniet monitoring system

No.	Product name	Quantity	Product external model
1	MSC-C card	1	MSC-C-C (domestic version)/MSC-C-A (Asia-Pacific version)
2	Intelligent tmperature sensor	2	IRM-S01T
3	Water leakage detective belt sensor	1	IRM-S01W (5m)
4	Wireless Modem (USB port, optional)	1	Baiyi-181M
5	Intelligent digital input sensor with RJ45 ports	2	IRM-S04DIF

3.6.1 Installing MSC-C Card

The MSC-C card is a Web/SNMP intelligent device monitoring card, which can monitor the system state of intelligent devices, record alarm events, and notify the user of the intelligent device alarms through email or SMS mode. The MSC-C card also enables you to set operating parameters and view device states through the embedded Web HMI, moreover, it can send the states of the monitored intelligent devices to the network management software (NMS) through SNMP protocol mode.

The appearance of the MSC-C card is shown in Figure 3-16.

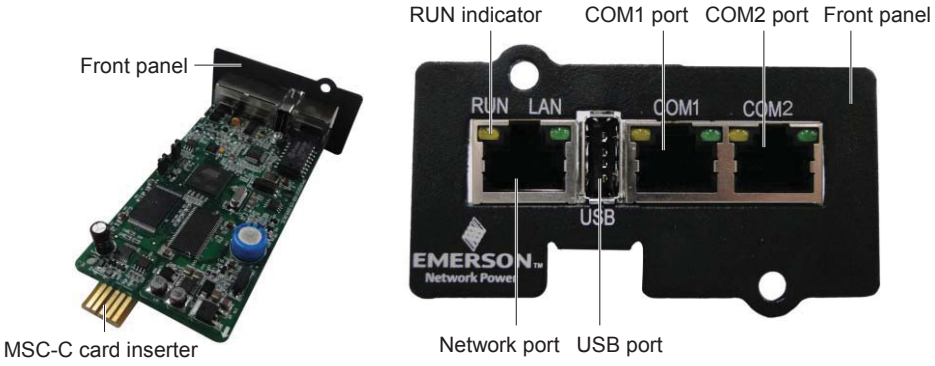


Figure 3-16 Appearance of the MSC-C card

Table 3-6 Performance specifications

Connected component	Cable standard	Connected distance (unit: m)	Connected number / connected point
Port connecting to node	Twisted pair cable of standard category 4	≤ 100	8*
Note*: The intelligent devices all connect to COM2 of MSC-C, and the device number in serial connection cannot exceed 8pcs			

3.6.2 Notes

When installing MSC-C, take the following precautions to avoid personnel injury and device damage by accident.

- Always cut off the power before performing any installation operation on the MSC-C
- Ensure that the external devices are connected to the correct MSC-C ports
- Wear an ESD wrist-wrap during installation
- Arrange the wires properly, and do not put any heavy objects on the wires or stamp the wires

Make sure that the jumpers of MSC-C card are set to correct position. The jumper locations are shown in Figure 3-17. See Table 3-7 for the jumper setting of the MSC-C card.

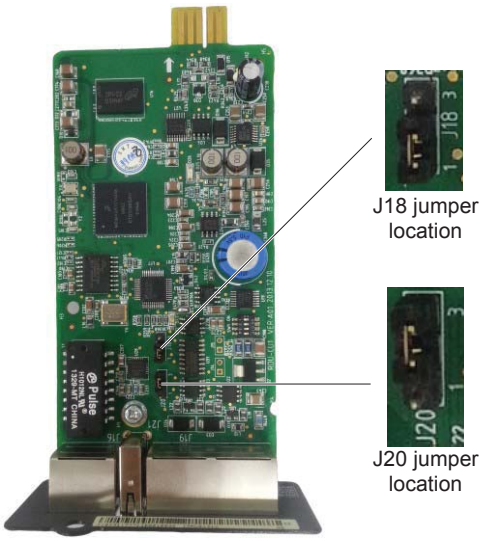


Figure 3-17 Jumper locations of the MSC-C card

Table 3-7 Jumper setting of the MSC-C card

Working mode	Jumper setting	Description
Maintanence mode	J20 J18	The USB port is used to login the MSC-C card through Hyper Terminal (TTY) or Remote Login (Telnet)
Normal mode	J20 J18	The USB port is used to connect to the SMS module
Reset mode	J18	When you forget the password of 'rduadmin', password of Web system administrator 'admin' and IP address, set the jumpers according to this mode, reboot the MSC-C card, and wait more than 20s to recover the above three parameters to be default values

The jumper setting of the MSC-C card is normal mode by default.

The MSC-C card inserter is used to insert the MSC-C card into the intellislot intelligent card slot of the UPS. Use screws to tighten it, as shown in Figure 3-18.

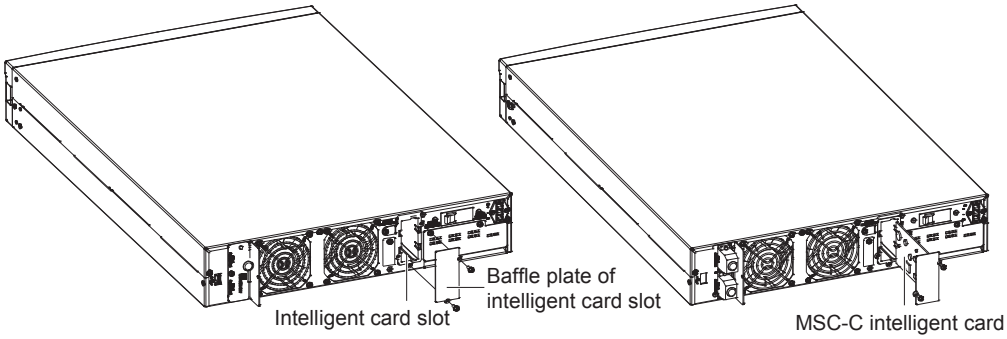


Figure 3-18 Schematic diagram of installing MSC-C card

3.6.3 Installing Sensors

Note

For the detailed installation guide of the sensors, refer to *IRM-S01T Intelligent Temperature Sensor User Manual*, *IRM-S04DIF Intelligent Digital Input Sensor With RJ45 Ports User Manual*, *IRM-S01W Water Leakage Detective Belt Sensor User Manual* and *G Net EDGE Wireless Network Card With USB Port User Manual*.

1. Install temperature sensor

1) Stick an IRM-S01T temperature sensor installed with magnet onto the middle part (an indication label is pasted) of the front right vertical pole of the cabinet, as shown in Figure 3-19.

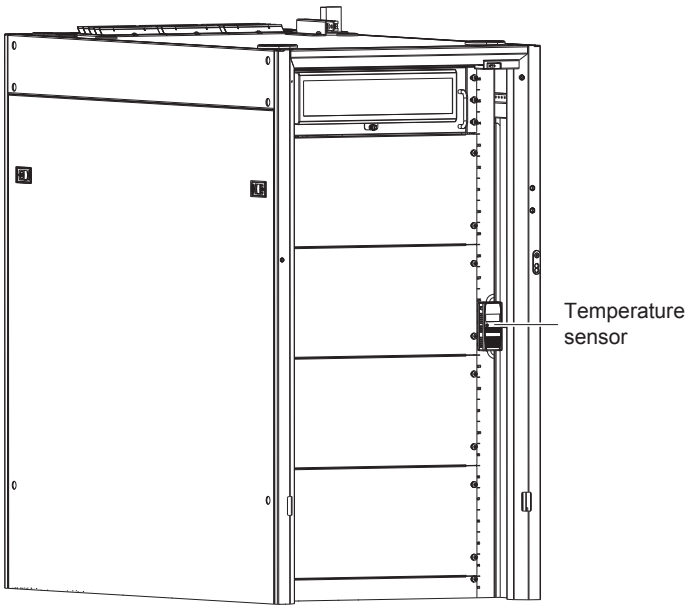


Figure 3-19 Installing temperature sensor of front door

2) The other IRM-S01T temperature sensor installed with magnet has already been installed on the labeled position on the left cable trough on rear door of the cabinet, as shown in Figure 3-20.

2. Install 4DIF sensor

The IRM-S04DIF sensor installed with magnet has already been installed on the cable holder on rear door of the cabinet, as shown in Figure 3-20.

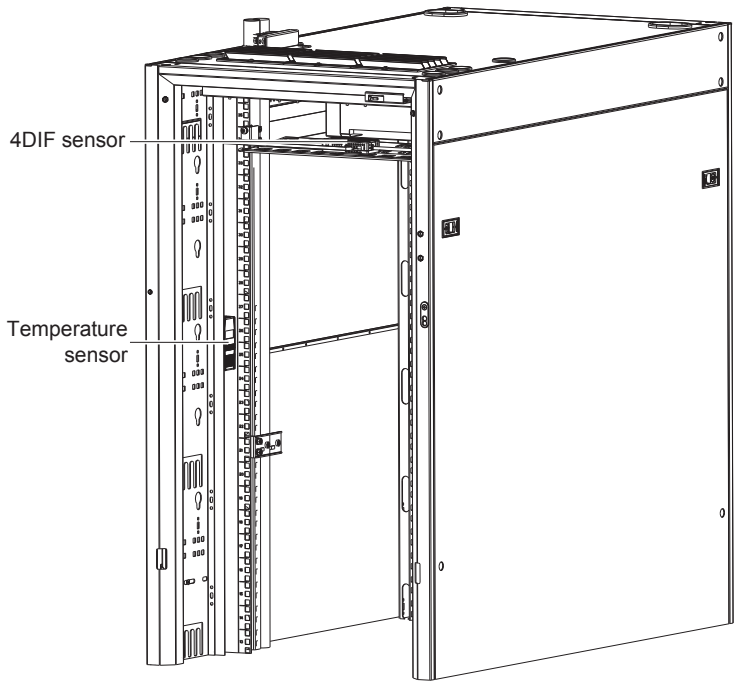


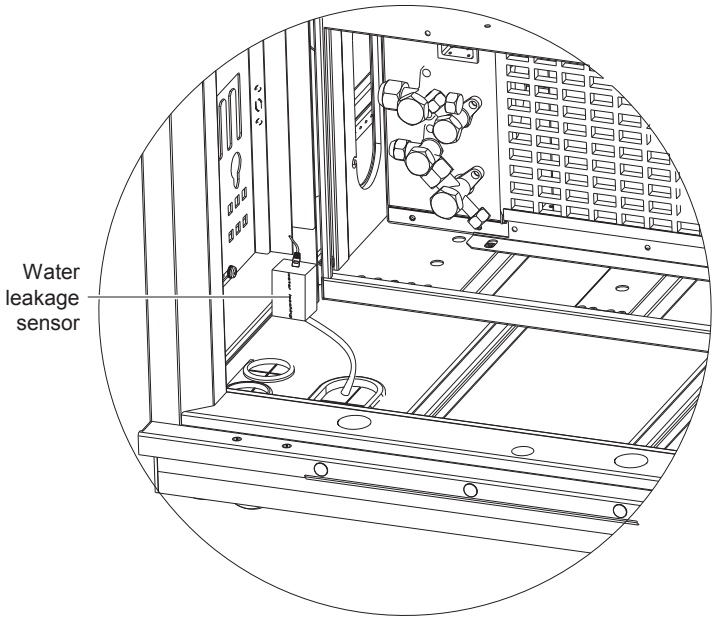
Figure 3-20 Installing temperature sensor and 4DIF sensor

3. Install water leakage sensor

1) Open the rear door of the empty cabinet, stick the water leakage sensor onto the lower part of the cable organizer.

2) Connect the water leakage detective belt, lead and fasten the detective belt properly with the provided cable tie fixture kits.

3) Lay the detective belt at the bottom of the cabinet, as shown in Figure 3-21.



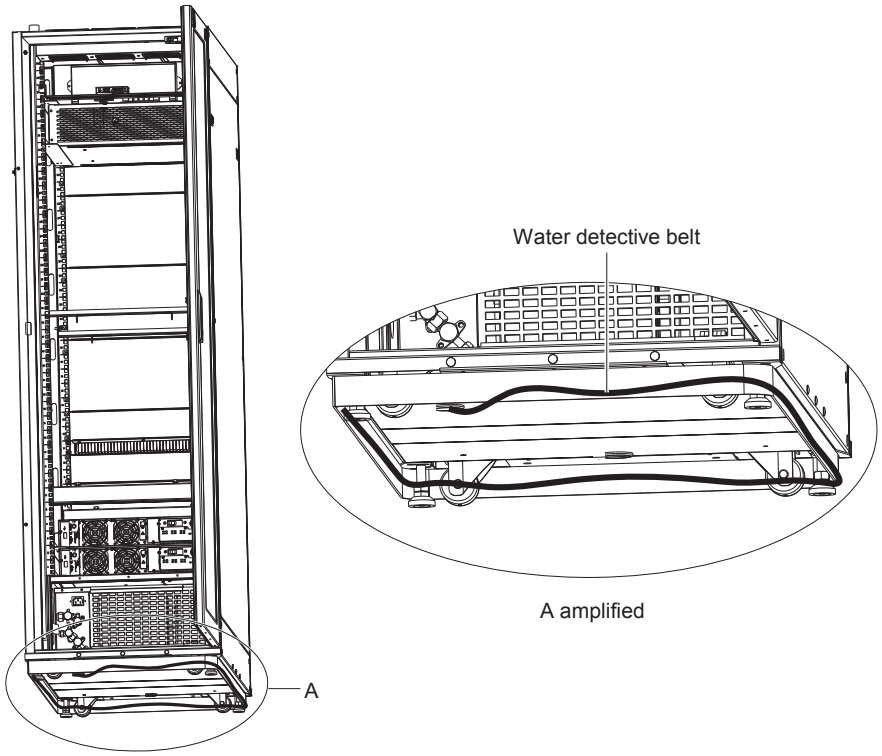


Figure 3-21 Installing water leakage sensor

3.6.4 Installing Wireless Modem (Option)

1. Connect the wireless Modem to the USB port of the MSC-C card.

2. Stick the wireless Modem aerial that contains magnet onto the bottom plate of the hot aisle, as shown in Figure 3-22.

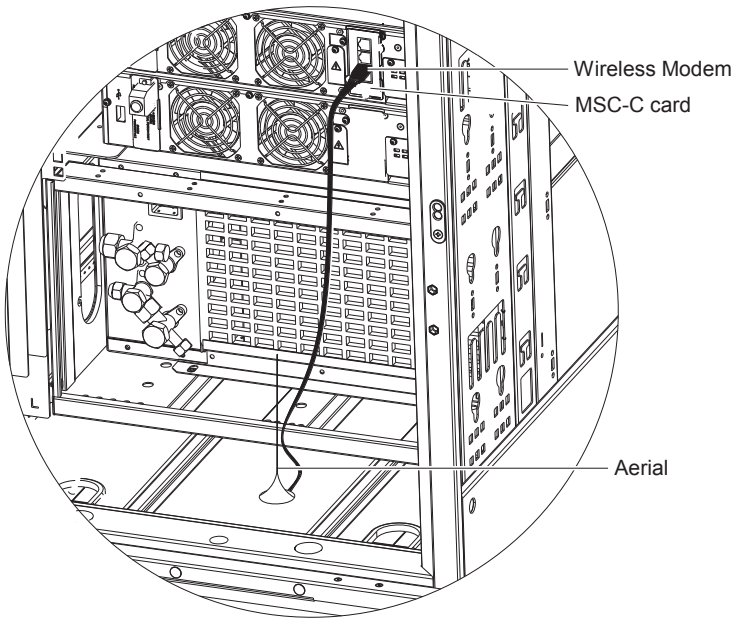


Figure 3-22 Installing wireless Modem

3.6.5 Adjusting Micro Switch

There are micro switches on the upper right corner of the front and rear doorframes. To prevent the micro switch from being pressed and damaged by the door during transportation, before delivery, the micro switch retracts back to the

cabinet and does not contact with the front / rear door, therefore, you need to adjust the position of the micro switch before startup in field.

1. Loosen the two fixing screws on the micro switch metal kit.

2. Adjust the metal kit to the arrow direction shown in Figure 3-23, ensure that the opening and closing of the front / rear door can trigger action of the micro switch, as shown in Figure 3-23.

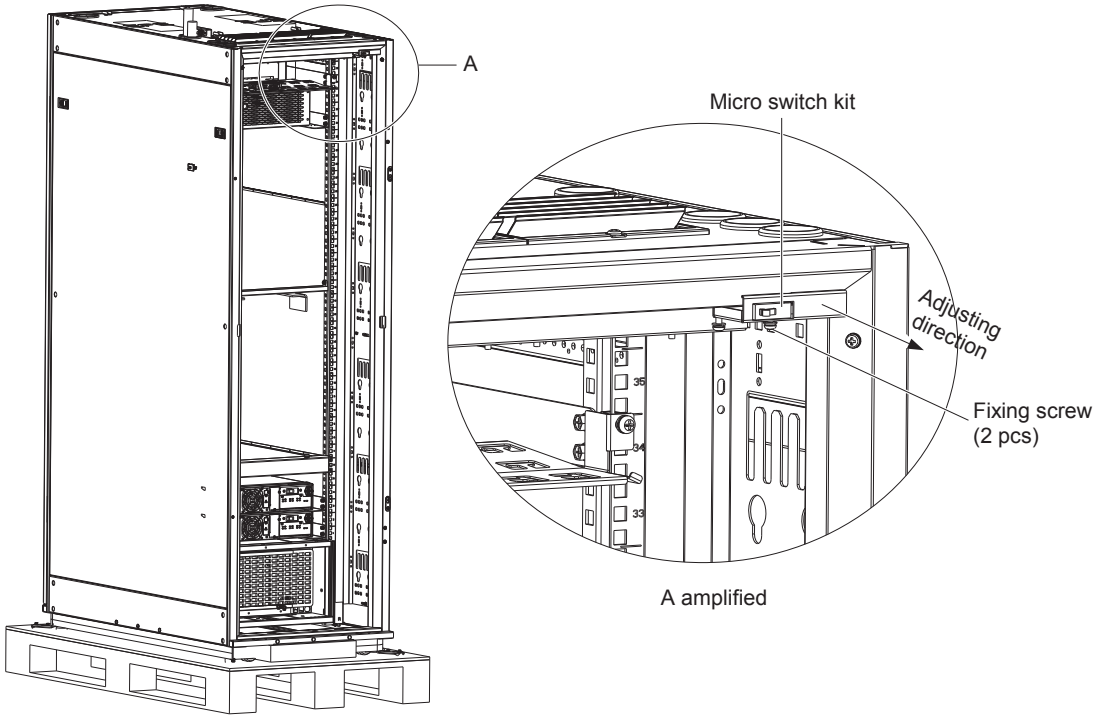


Figure 3-23 Adjusting micro switch

3.7 Cable Connection

Note

1. You need to prepare external total input cable by yourself. Please use the cable that complies with local regulations as the power cable of the SmartCabinet.

2. Bind the power cable and the communication cable separately on the cable organizers on both sides in the rear space of cabinet. It is recommended to manage the power cable on the right cable organizer and manage the communication cables on the left cable organizer.

The wiring of PMU, UPS, PDU, intelligent emergency fan unit and AC power inside the cabinet has been completed before delivery. You only need to connect the cable between the UPS and the battery, and the UPS input and output cables (lines have been reserved on the ports).

3.7.1 UPS Power Distribution Connection

1. Do not reverse the input neutral line and live line.

2. Connect the output neutral line and live line and ground line correctly and reliably. For the sake of safety, the ground line must be connected firstly.

The power cables of the UPS should be connected through the I/O terminal block located on the UPS rear panel. Remove the cover plate of I/O terminal block, and the terminal layout of the I/O terminal block is revealed, as shown in Figure 3-24.

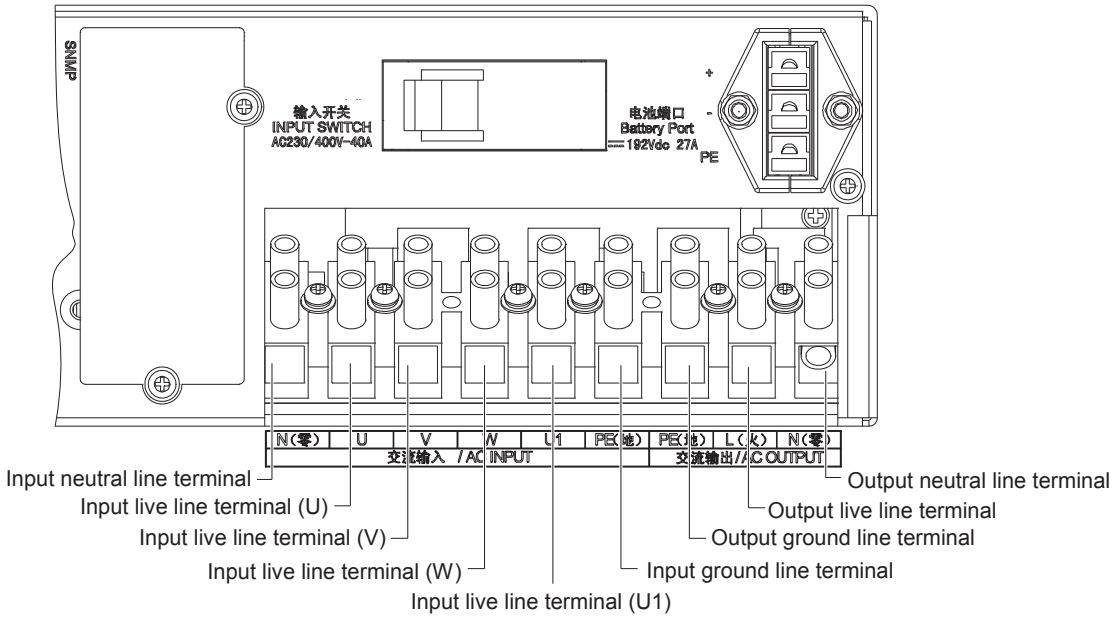


Figure 3-24 Terminals layout of the I/O terminal block

Power distribution mode

The UPS power distribution mode in the SmartCabinet is 1-in 1-out (factory default), and the detailed connection procedures are as follows:

1. Make sure that all the external I/O MCBs of the UPS are open.
2. Remove the protective cover of the I/O terminal block.
3. Connect N line, L line and PE line of the main input cable W01 (Input) respectively to the input neutral line terminal (N), input live line terminal (U), input ground line terminal of the UPS I/O terminal block, and tighten the fixing screws, as shown in Figure 3-25.
4. Connect L line, N line and PE line of the output cable W02 (Output) respectively to the output live line terminal (L), output neutral line terminal (N) and output ground line terminal (PE) of the UPS I/O terminal block, and tighten the fixing screws, as shown in Figure 3-25.
5. Ensure that the input live line terminal (V), input live line terminal (W) and input live line terminal (U1) have been shorted by using the shorting wire (label: W01) provided by the UPS.
6. Restore the protective cover of the I/O terminal block.

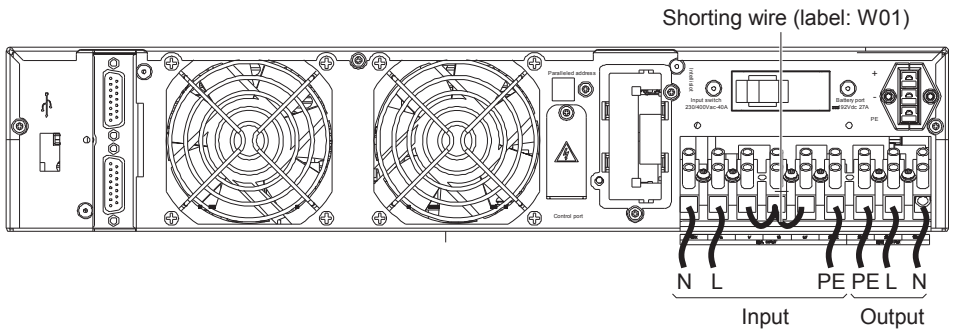


Figure 3-25 Cable connection for 1-in 1-out

Note

1. The UPS input and output cables are two 3-line cables, and there are line labels on the line ends connected to the UPS.
2. W01 and W02, the two 3-line cables are respectively connected to the corresponding L, N, PE ports on the terminal block according to the line color. (Blown – L, Blue – N, Yellow-green – PE).
3. For detailed cable connection information, refer to *Liebert® ITA 5kVA UPS Installation And Commissioning Manual*.

3.7.2 Connecting Battery Cable

Take out battery cable A from the UPS accessories, connect the red, black and yellow terminals on one end of battery cable A with the corresponding terminals of the battery port on the rear panel of the UPS, and connect the other end with any battery port on the battery module, as shown in Figure 3-26.

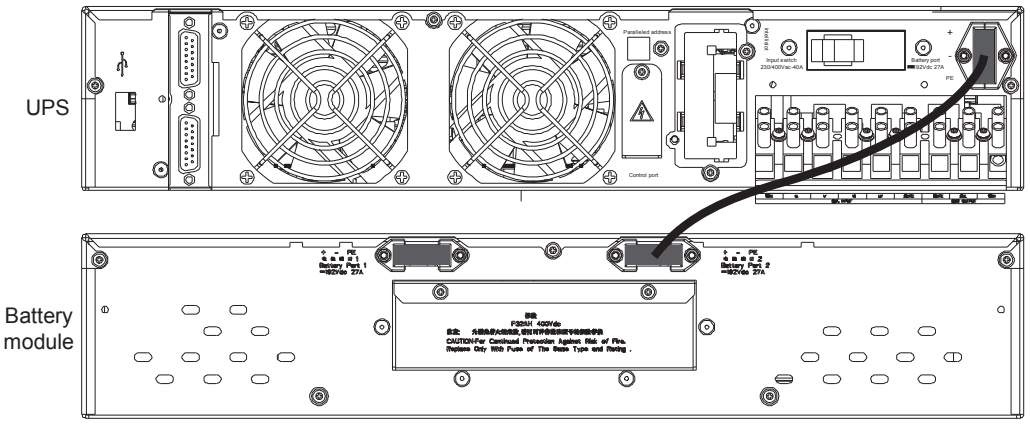


Figure 3-26 Connecting the UPS with the battery

Note

For cable connection of the UPS and the battery and detailed information, refer to *Liebert® ITA 5kVA UPS Installation And Commissioning Manual*.

3.7.3 Connecting MSC-C Cables

1. Connect the two communication network cables reversed around the intelligent card slot on rear panel of the UPS to the corresponding ports of MSC-C card, as shown in Figure 3-27. Connect the cable W08B to the COM1 port of MSC-C card, and connect the cable W12 (COM2) to the COM2 port of MSC-C card.

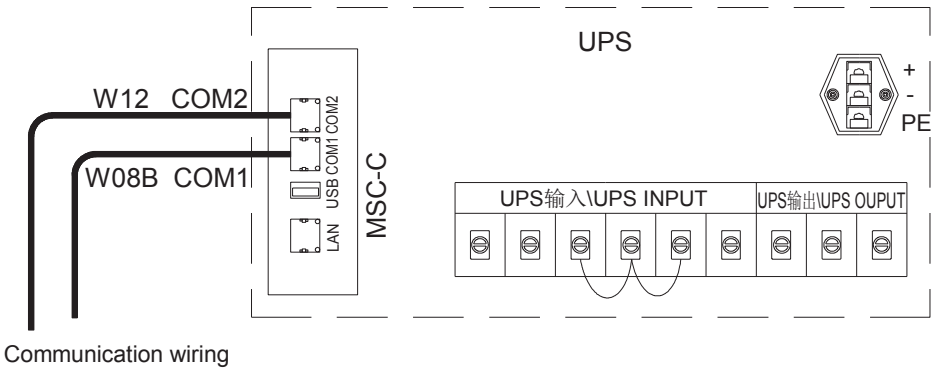


Figure 3-27 Cable connection of COM port of MAC-C card

3.7.4 Connecting Total Input Cable Of System

You need to self-prepare total input cable according to the installation position of the SmartCabinet in field. When connecting the cable, comply with local regulations of cable connection, consider the environment and refer to IEC60950-1 Table 3B. it is recommended that the minimal CSA of selected cable be 6mm^2 and the external total input air breaker is larger than or equal to 80A.

Note

The UPS is a large current leakage device, so it is not recommended to configure a residual current operated circuit breaker (RCCB).

The procedures for connecting the total input cable are as follows:

1. Press and connect OT terminal (accessory) on the cable end.

2. Open the cover plate on the back of the PMU, connect the made cable to the total input position on the PMU connecting terminal block, as shown in Figure 3-28.

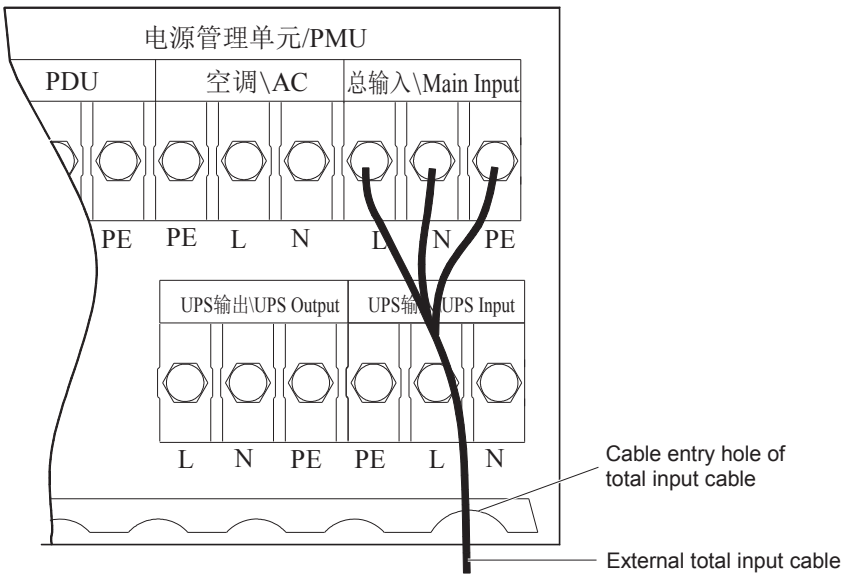


Figure 3-28 Connecting total input cable

3. Place the cable into the cable entry hole of total input cable, and restore the cover plate.

3.7.5 Connecting Cables Of Indoor And Outdoor Units

1. Open the cover plate for cable connection of the outdoor unit, lead the connecting cable (5-core, 7m) between the indoor unit and the outdoor unit and the 485 control cable (2-core insert-type, 7m) through the cable entry hole on the cover plate, and connect the cable to the corresponding terminal stud of indoor unit according to the label on the cable end, as shown in Figure 3-29.

2. Restore the cover plate.

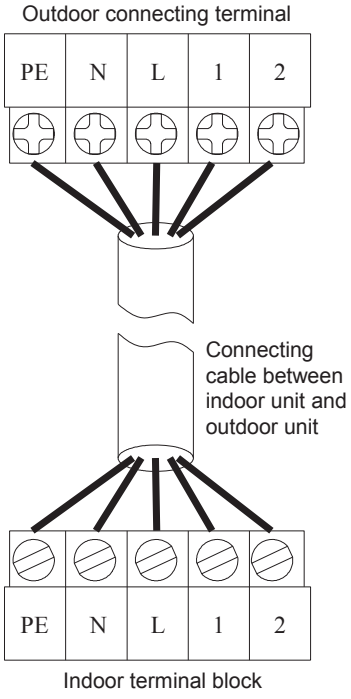

Outdoor connecting terminal
PE N L 1 2
Connecting cable between indoor unit and outdoor unit
PE N L 1 2
Indoor terminal block

Figure 3-29 Connecting power cable of outdoor unit

3.7.6 Connecting Earth Cable

There is an earth hole with an earth label on the bottom of the rear door of the cabinet, as shown in Figure 3-30. When earthing, use a M6 screw to fix one end of the earth cable on the earth hole, and lead the other end through the rubber protective ring on the bottom plate to the earth copper bar of the computer room.

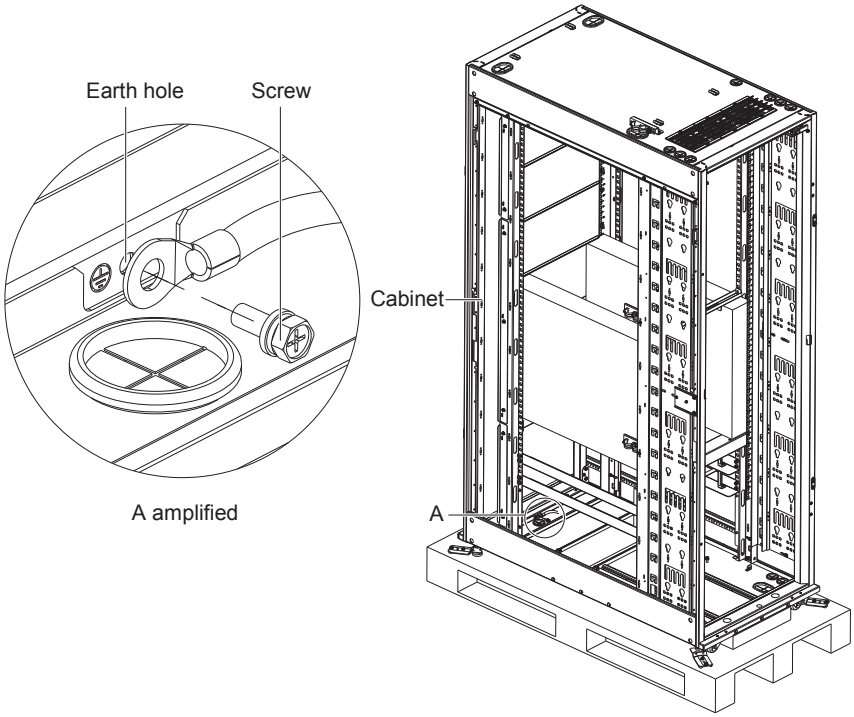


Figure 3-30 Connecting earth cable

Note

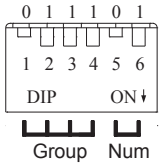
1. To ensure safety, the cabinet and the AC components must be reliably grounded.

2. Use a yellow-green earth cable of no less than 6mm^2 and connect it to the earth copper bar of the computer room reliably. When fixing the M6 screw on the earth hole of the cabinet, a wrench is recommended.

3. If there is no earth block in the building where the SmartCabinet is placed, you can use a yellow-green earth cable of no less than 6mm^2 to connect the earth terminal of cabinet with that of PMU total input, to ensure reliable earthing of the cabinet.

3.8 Configure Communication Address And Port

1. Set the addresses of the temperature sensor through the DIP switch, as shown in Figure 3-31 and Table 3-8.



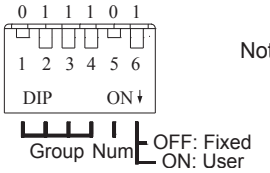
Note: 1. DIP switch in the ON position means 1, or it means 0;
2. The sensor address cannot be set as 00, which is the broadcast address.

Figure 3-31 Set the address of the temperature sensor through DIP switch

Table 3-8 DIP list for setting the temperature sensor address

Device	DIP1 ~ DIP4	Group	DIP5 ~ DIP6	Number
Front door side S01T	0 0 0 2	1	0 1	1
Rear door side S01T	0 0 0 2	1	1 0	2

2. Set the 4DI sensor address through DIP switch, as shown in Figure 3-32 and Table 3-9.



Note: 1. DIP switch in the ON position means 1, or it means 0;
2. The sensor address cannot be set as 00, which is the broadcast address.

Figure 3-32 Set the 4DI sensor address through DIP switch

Table 3-9 DIP list for setting the 4DI sensor address

Device	DIP1 ~ DIP4	Group	DIP5	Number	DIP6	Connected equipment type
4DIF	0 0 0 0	0	1	1	0	0

Note

The DIP addresses of the temperature sensor and the 4DIF sensor have been set before delivery. This section only serves for you to confirm them in field.

3.9 Cable Management And Installation Accessories

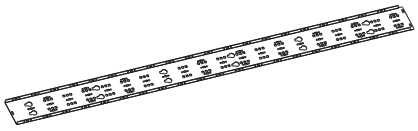
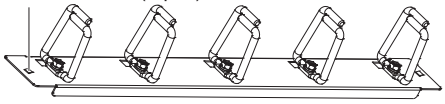
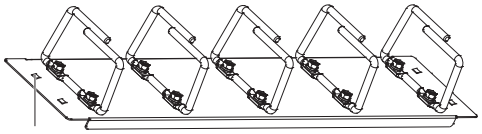
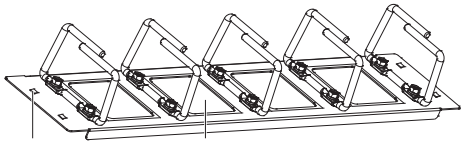
The cabinet is configured with two vertical cable organizers in the rear door area, one is at left and the other is at right, as shown in Figure 3-15. To avoid system interference, the power cable and the communication cable should be bound separately by using optional accessories such as velcro strip, standard cable management unit.

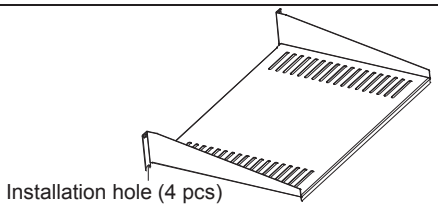
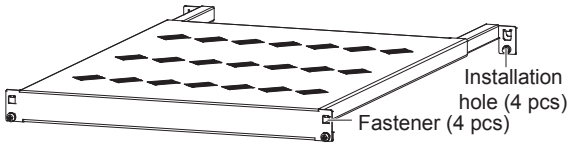
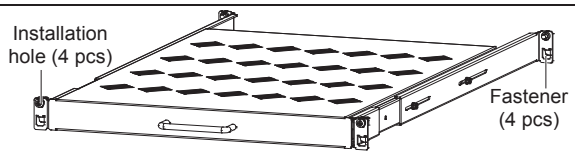
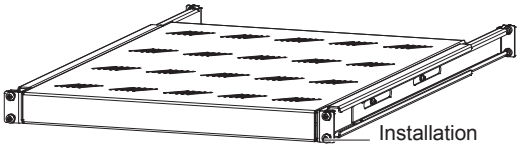
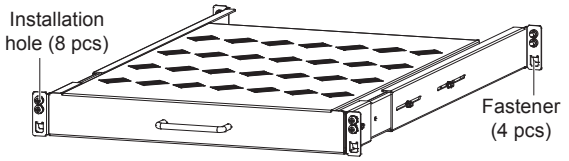
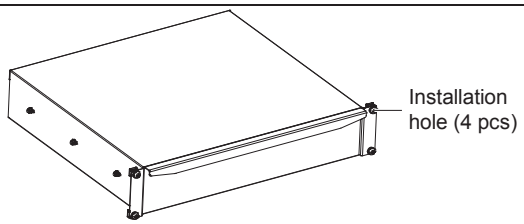
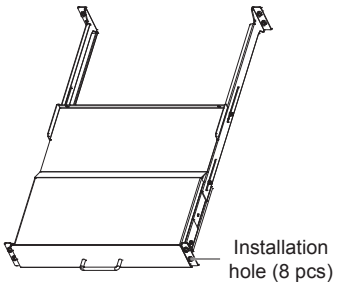
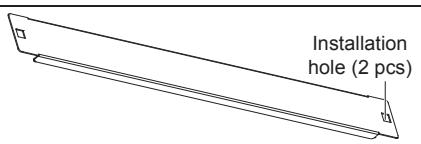
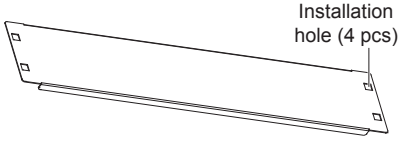
Note

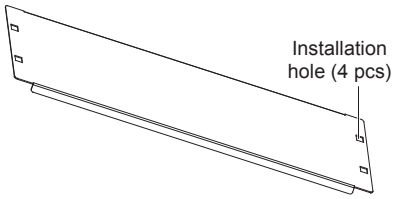
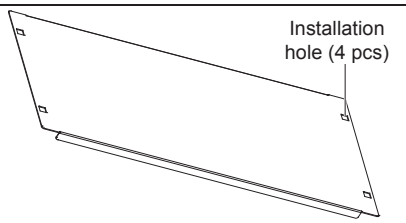
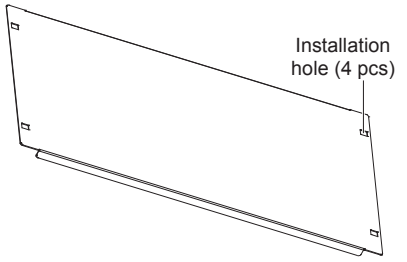
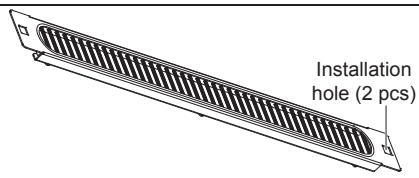
1. The U height space which is not occupied by equipment should be covered by the dummy panel.
2. After the cable layout is completed, use sealant to seal the used cable entry holes, to keep the cabinet be airtight.

The optional accessories of the cabinet are given in Table 3-10.

Table 3-10 Optional accessories

Name		Description	Appearance
Velcro strip without installation base		The length is 4.56m; it is recommended to configure two for each cabinet	
Cable management panel	Vertical cable organizer	Managing the cable at the rear of the cabinet in vertical direction, meanwhile, the gourd-shaped hole can be used to install PDU	
	1U Cable management panel	Tool-less installation mode; arranging the cables at the front and back of 19'' cabinet horizontally	
	2U Cable management panel	Tool-less installation mode; arranging the cables at the front and back of 19'' rack horizontally	
	2U Cable management panel with cable entry holes	Tool-less installation mode; arranging the cables horizontally or from front to back	

Name		Description	Appearance
Shelf	Cantilever fixed shelf	Applicable to network cabinets, capable of bearing 25kg load	
	Light duty fixed shelf	Applicable to server cabinets, capable of bearing 50kg; the support rails can be adjusted to satisfy different installation depth	
	Light duty pull-out shelf	Applicable to server cabinets, capable of bearing 45kg; the telescopic rails can be adjusted to satisfy different installation depth	
	Heavy duty fixed shelf	Applicable to server cabinets, capable of bearing more than 120kg; 1U height; the support rails can be adjusted to satisfy different installation depth	
	Heavy duty pull-out shelf	Applicable to server cabinets, capable of bearing more than 80kg; 1U height; the telescopic rails can be adjusted to satisfy different installation depth; equipped with a handle and positioning pins	
	2U drawer	Applicable to server cabinets, capable of bearing 15kg	
	19'' keyboard drawer	Applicable to server cabinets, capable of bearing 22.7kg; four-point positioning; the 19'' keyboard can be placed on the cabinet; equipped with mouse plate; the keyboard tray and mouse plate can be freely drawn out; the support rails can be adjusted to satisfy different installation depth	
Dummy plate	1U dummy plate	Tool-less installation mode	
	2U dummy plate	Tool-less installation mode	

Name		Description	Appearance
Dummy plate	3U dummy plate	Tool-less installation mode	
	5U dummy plate	Tool-less installation mode	
	6U dummy plate	Tool-less installation mode	
	1U dummy plate with brush	Non-tool installation mode; selected for front cabling of the cabinet	

Chapter 4 Operation Instructions

This chapter introduces the operation instructions of SmartCabinet, including check before startup, and procedures of power on and power off.

4.1 Check Before Startup

Check the following before startup of SmartCabinet:

1. Check whether the AC pipe system is connected correctly and firmly, and there is no leakage.

2. Check and confirm that the power distribution mode of UPS and PMU, connections of the power cables and the signal cables are correct, and that there is no short circuit.

3. Check that the installation and cable connection of the batteries are correct, and that the positive pole and negative pole of the battery are correct.

4. Measure and check that the voltage and frequency of the mains are normal.

5. Check and confirm that all of the communication cables are connected correctly and firmly.

6. Check and confirm that the remained unoccupied U height space is covered by the dummy plate.

Warning

1. Before startup of the SmartCabinet, ensure that the maintenance bypass air breaker on the MSC-PMU is off and locked by a metal latch.

2. Before startup, ensure that the indicator of the SPD module is green.

4.2 Startup

The startup flow chart of SmartCabinet is shown in Figure 4-1.

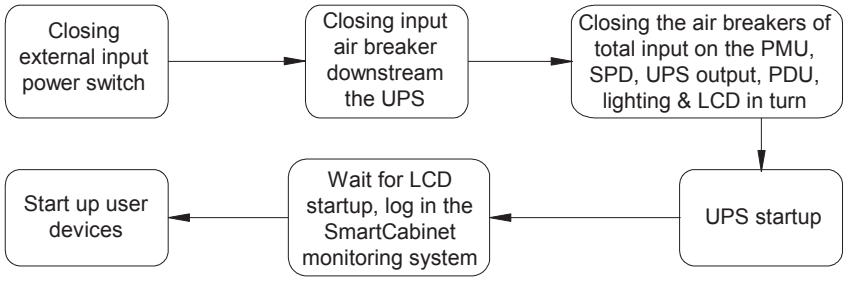

Closing external input power switch
Closing input air breaker downstream the UPS
Closing the air breakers of total input on the PMU, SPD, UPS output, PDU, lighting & LCD in turn
UPS startup
Wait for LCD startup, log in the SmartCabinet monitoring system
Start up user devices

Figure 4-1 Startup flow chart

The startup procedures are as follows:

1. Close the external input power switch.

2. Close the input air breaker downstream the UPS.

3. Close the main input air breaker on the MSC-PMU, SPD module air breaker, UPS input air breaker, AC input power air breaker, UPS output air breaker, lighting & LCD air breaker from left to right in turn, as shown in Figure 4-2.

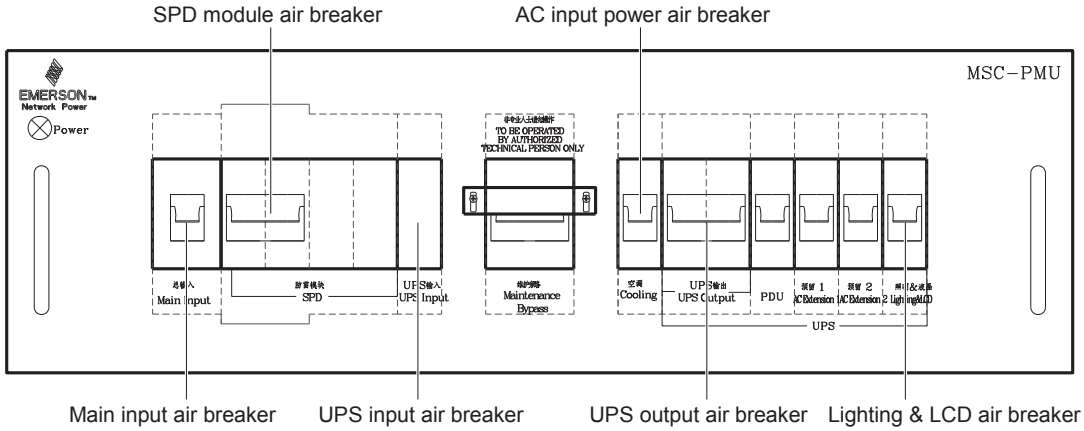
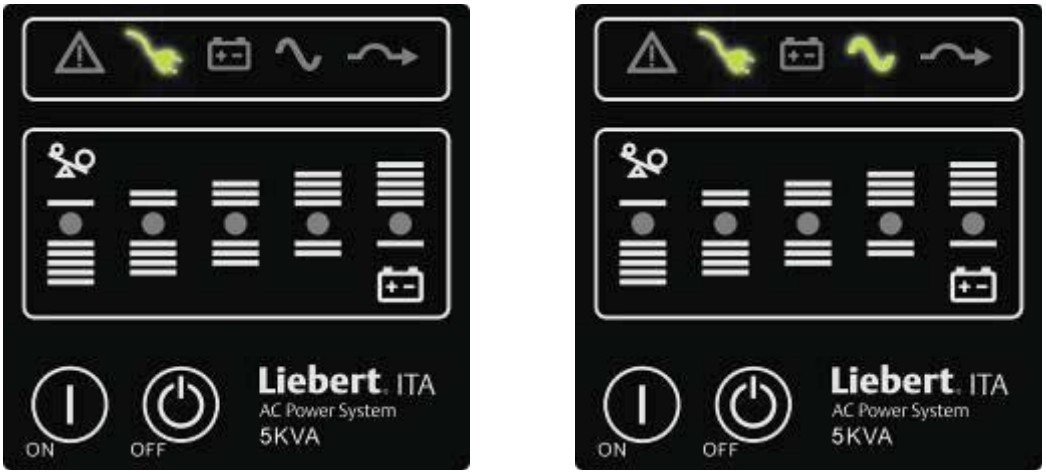


Figure 4-2 PMU operation panel

4. The AC is powered directly by the mains. After the power input air breaker is closed, wait about 5s, the AC inner fan will start up.

5. After the UPS is powered on, it enters self-test state (including battery self-test), all LED indicators blink and the beeper beeps discontinuously. After the self-test, the UPS will enter the standby mode, and the MAINS indicator will turn on, as shown in Figure 4-3 (a). Press the ON/SILENCE key for above 1s, and wait about 30s, the UPS will switch to inverter standby mode, and the INVERTER indicator will blink. When the UPS has output, the INVERTER indicator will turn on, as shown in Figure 4-3 (b).



(a) *(b)*

Figure 4-3 Indicator state

6. Measure whether the inverter output voltage is normal.

7. After the UPS inverter output becomes normal, the LCD on the front door will get power and start up. Log in the SmartCabinet monitoring system.

8. Open the front and rear doors, observe whether the LED indicators can turn on.

Note

For the precautions in the process of UPS start, refer to *Liebert® ITA 5kVA UPS Installation And Commissioning Manual*.

Warning

Only the trained and authorized professional can start up the SmartCabinet. The personnel from the Emerson Service Center are recommended.

4.3 System Commissioning (Web Page)

For detailed system commissioning operation on the Web page, refer to *Chapter 6 Web Page Of MSC-C*.

4.4 Power Off

The power-off flowchart of SmartRow is shown in Figure 4-4.

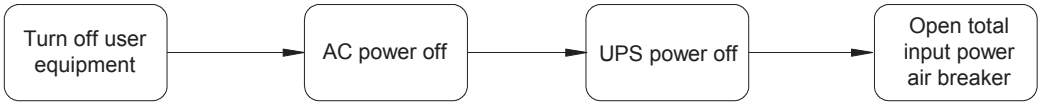


Figure 4-4 Power-off flowchart

The power-off procedures are as follows:

1. Ensure that all user IT equipment are powered off.
2. Enter the **Hot Management** menu of the LCD monitoring system to turn off the AC.
3. After the AC stops flowing cold wind, open the AC air breaker on the PMU.
4. Press the OFF key on the display panel of the UPS.
5. Open the UPS input and output air breakers.
6. Open the total input air breaker on the PMU.
7. Check that all the equipment is powered off, and close all the doors of the cabinet.

Chapter 5 Operation On Display Panel

This chapter introduces operation on the display panel of the SmartCabinet, including license page, startup page, system homepage and menu items of the SmartCabinet.

5.1 License Page

1. Upon initial startup, the WEB page has not been authorized, the license page will pop up, as shown in Figure 5-1.

Figure 5-1 License page

2. The authorized commissioning engineer calls the customer service hotline of Emerson Network Power Co., Ltd.: 400-887-6510, to get the password.

3. Type the gotten password in the textbox of **License**, and then click **OK**.

4. If the authorization is a success, the system will jump to the login page automatically.

Note

For Asia-Pacific version, there is no need of authorizing, so the display screen will not display the License page and the 400 service telephone number.

5.2 Startup Page

If the license is correct, the system will jump to the login page automatically, as shown in Figure 5-2.

Figure 5-2 Startup page

Note

After normal startup, the startup page will jump to the system homepage automatically, without any operation.

5.3 SmartCabinet Homepage

The SmartCabinet homepage is shown in Figure 5-3.

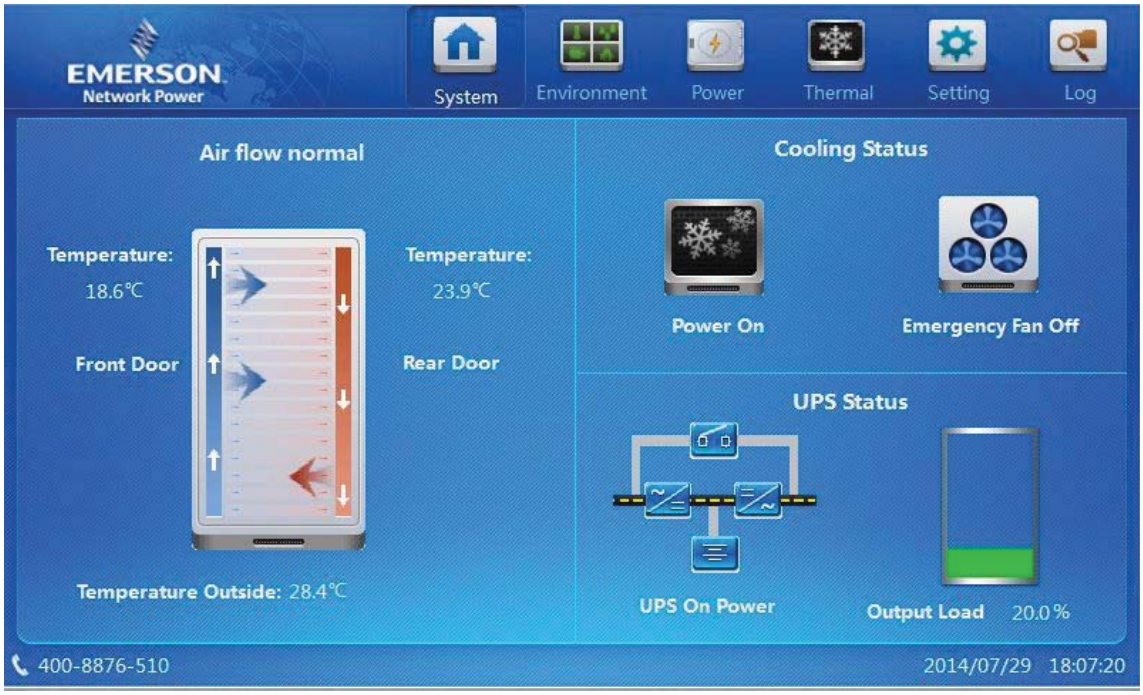


Figure 5-3 SmartCabinet homepage

On the SmartCabinet homepage, the menu items include **System**, **Environment**, **Power**, **Thermal**, **Setting** and **Log**. The system menu structure of the display panel is shown in Figure 5-4.

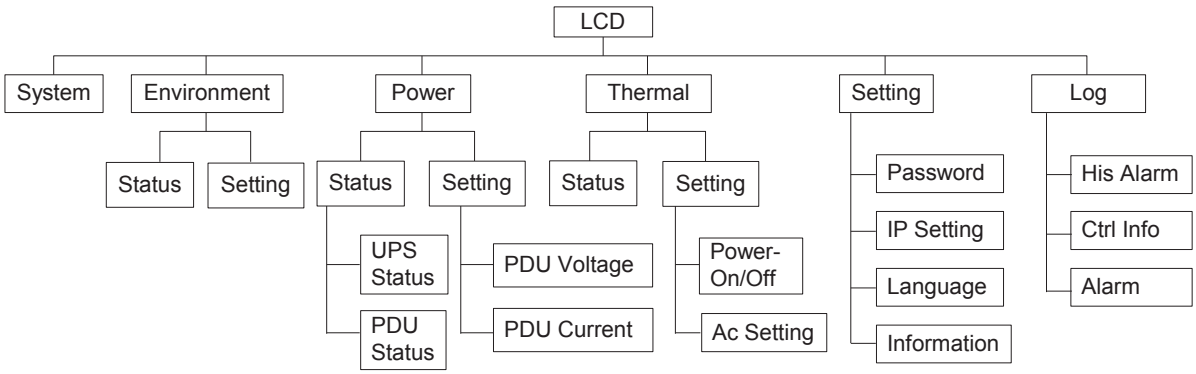


Figure 5-4 System menu structure of SmartCabinet

5.4 Menu Items

5.4.1 Main Information of SmartCabinet

On the display screen, click the **System** menu at the upper part, the system page will appear, displaying air flow status, cabinet cold aisle temperature, hot aisle temperature, AC status and UPS status, as shown in Figure 5-5.

Figure 5-5 System page

The system page is divided into four parts, the left part displays air flow cycle mode of SmartCabinet, front door temperature and rear door temperature; the upper right part displays thermal management mode inside the system, including AC on/off status and emergency fan on/off status. The lower right part displays UPS working mode and real-time load percentage of the system.

5.4.2 Environment

Click the **Environment** menu at the upper part, the status page will appear, as shown in Figure 5-6.

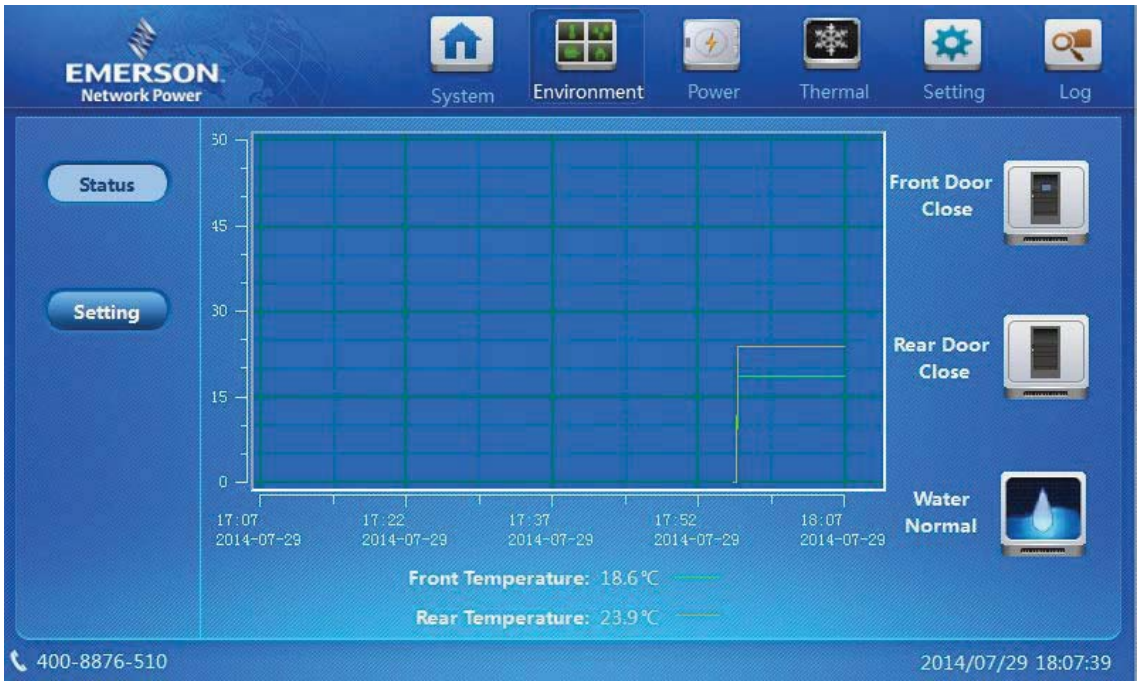


Figure 5-6 Environment page

The curve displays the front door temperature and rear door temperature within one hour in real time: the right part displays front door on/off status, rear door on/off status and water leakage status.

Clicking the **Setting** submenu can view the setting signal of environment temperature. If the current user does not have the authority, the login dialog box will pop up, as shown in Figure 5-7.

Figure 5-7 Login dialog box

Use admin to log in the system, the page will jump to the setting page automatically, as shown in Figure 5-8. If login fails, the page will not jump.

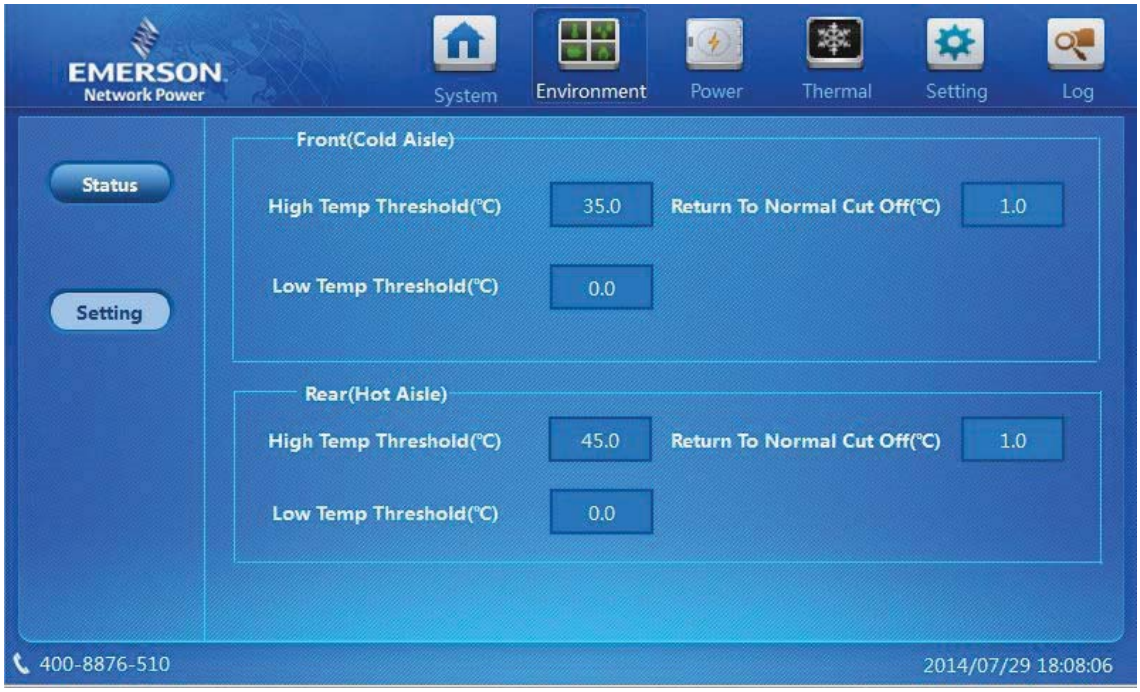


Figure 5-8 Environment temperature (setting)

In Figure 5-8, you can set parameters of intelligent temperature sensors. For example: type a setting valve in the field of **High Temp Threshold**, the setting range is 0 ~ 60.0. Press the valve edit box, a digit keyboard will pop up, type the valve you want to set, and click the **Enter** button on the digit keyboard, as shown in Figure 5-9, the typed valve will be sent to the device.

Note

The default valves of temperature alarm are as follows:

The alarm upper limit of front door temperature sensor is 35°C, and the alarm lower limit is 0°C; the alarm upper limit of rear door temperature sensor is 45°C, and the alarm lower limit is 0°C; the temperature alarm hysteresis is 1°C.

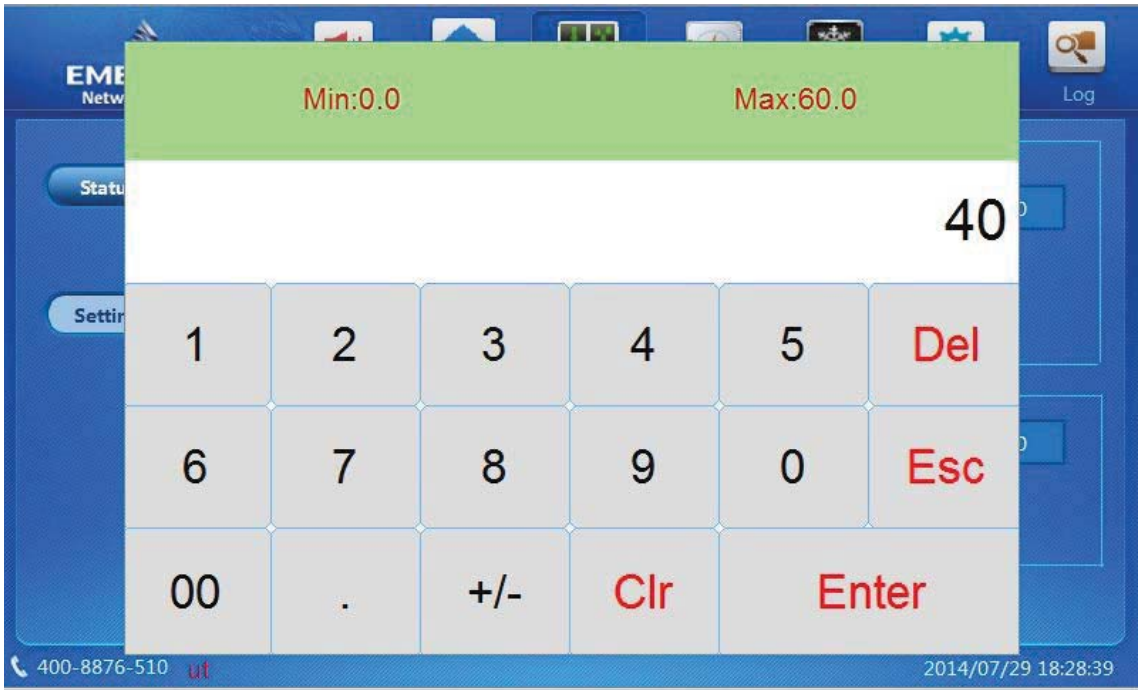


Figure 5-9 Example of setting valve

5.4.3 Power

Click the **Power** menu at the upper part of the page, the status page will appear, as shown in Figure 5-10.

Figure 5-10 Power status page

Click the **Setting** submenu in the left part, the setting page appears, as shown in Figure 5-11. The setting operation is the same as that of environment temperature.

Figure 5-11 Power setting page

Click the **Control** submenu in the left part, the control page appears, as shown in Figure 5-12.

You can realize on/off control over each place of the PDU through clicking the OFF/ON icon. When the icon is green and displaying ON status, it indicates that the PDU output status is ON; when the icon is grey and displaying OFF status, it indicates that the PDU output status is OFF.

Note

A 24-place Switch-model intelligent PDU is configured. The second place and the 23rd place of the PDU supply power for the emergency fan. The available PDU socket number is 22 places for the user.

Figure 5-12 Power control page

Click the **Control** submenu, the confirmation dialog box shown in Figure 5-13 pops up to require your second-time confirmation about the control operation. Click **OK** to execute the control operation, as shown in Figure 5-14.

Figure 5-13 Second-time confirmation about the power control

Figure 5-14 Power control setting

5.4.4 Thermal

Click the **Thermal** menu at the upper part of the page, the status page will appear, as shown in Figure 5-15.

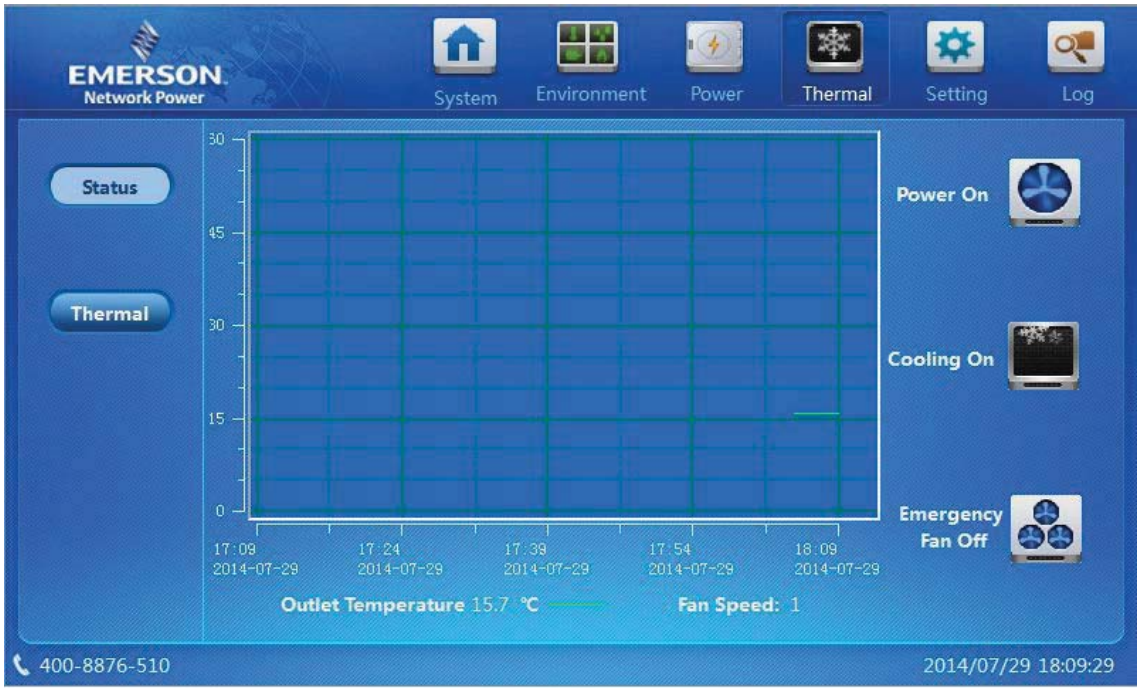


Figure 5-15 Thermal status page

Click the **Thermal** submenu at the left part, the thermal page will appear, as shown in Figure 5-16.

You can click the OFF/ON icon in the **Power On/Off** field, to realize AC on/off control in the SmartCabinet. The control and operation mode of AC on/off is the same as that of power control; the setting operation of **Temperature Setting** and **Temperature Accuracy** is the same as that of environment temperature.

Figure 5-16 Thermal page

5.4.5 Setting

On the SmartCabinet display panel, click the **Setting** menu on top of the page, four submenus appear, including **Password**, **IP Setting**, **Language** and **Information**.

Password

Click the **Password** submenu under the **Setting** menu, the page shown in Figure 5-17 pops up.

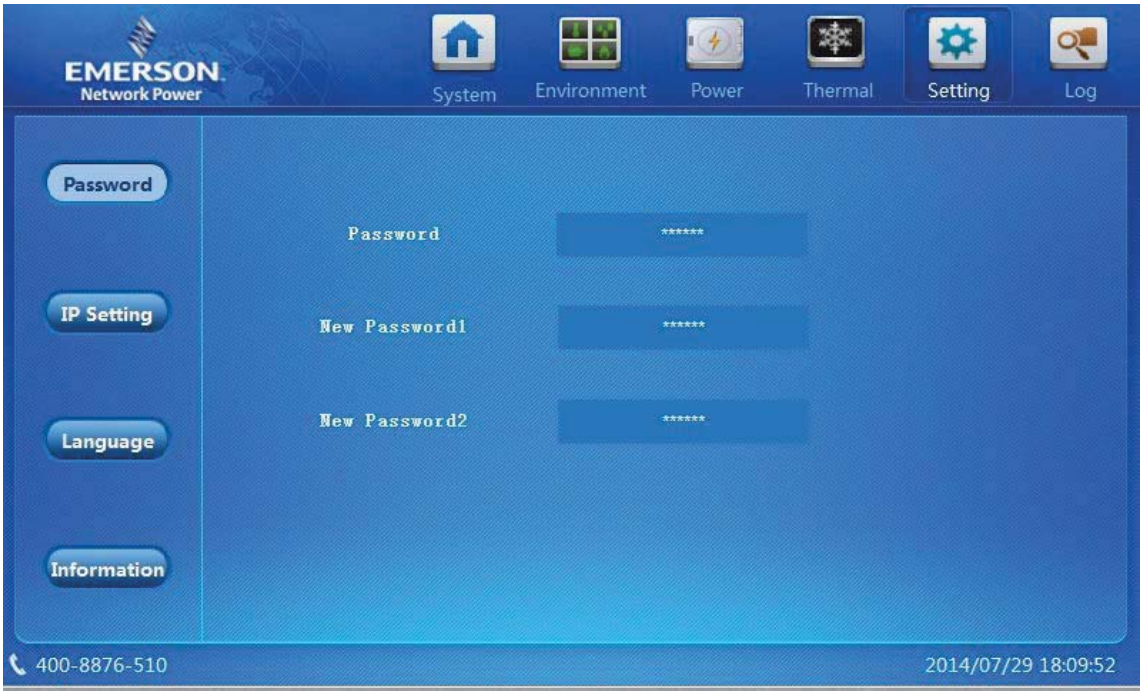


Figure 5-17 Password page

Click the input box, the user login dialog box will pop up. After login by using admin (only the user that has the control authority can perform password modification), type the **Password**, **New Password1** and **New Password2**, and click the **Set** button to complete the operation, as shown in Figure 5-18.

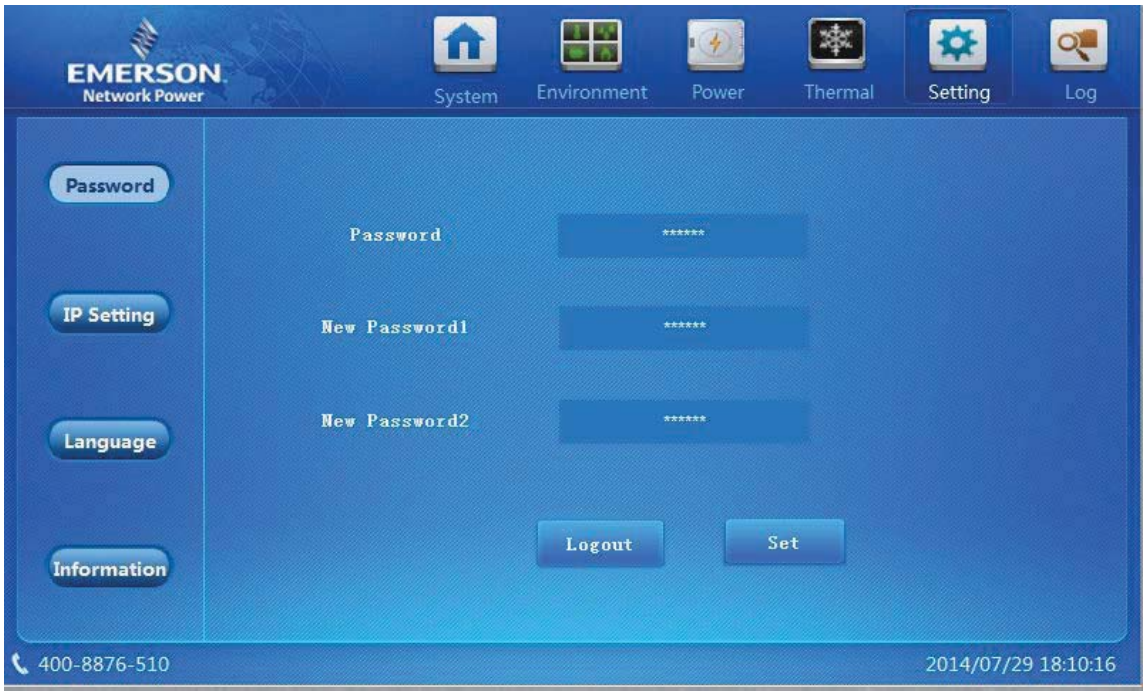


Figure 5-18 Password page (after login)

When you forget the original password, you can log in the SmartCabinet WEB page through IE browser, on the **System Options** -> **Restore System** page, click the **Restore LCD Password** button, the LCD will display the page shown in Figure 5-19, click the **Restore Default** button, the password of the LCD display panel will be restored to default: 1234.

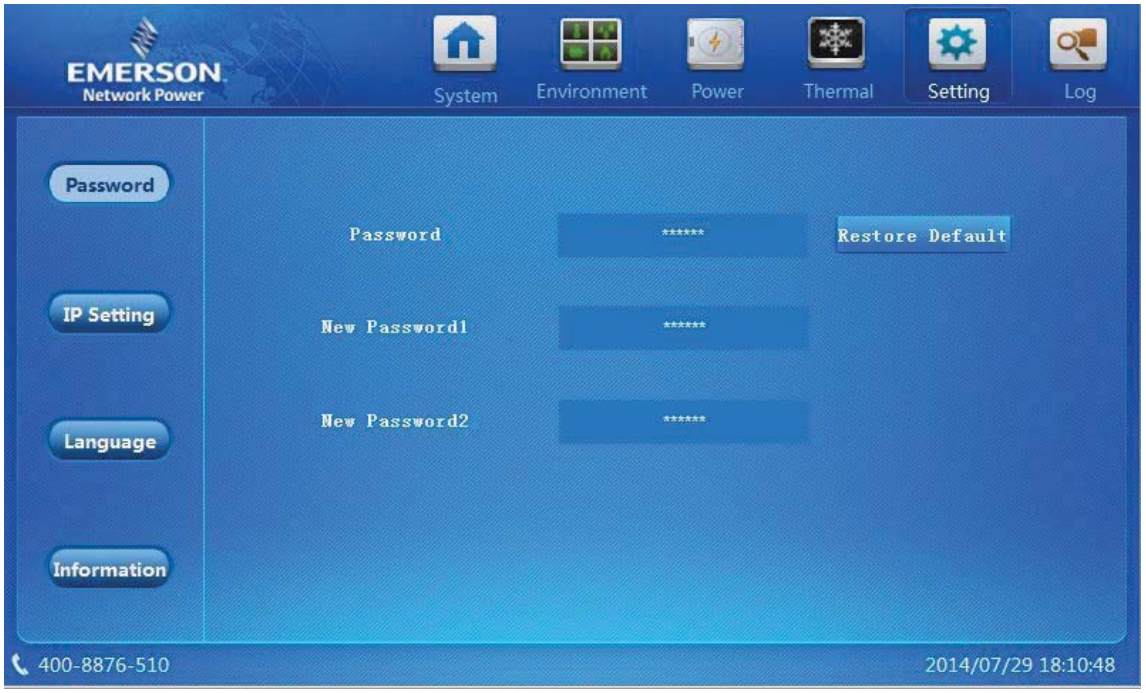


Figure 5-19 Password page

IP Setting

Click the **IP Setting** submenu under the **System** menu, the page shown in Figure 5-20 will pop up.

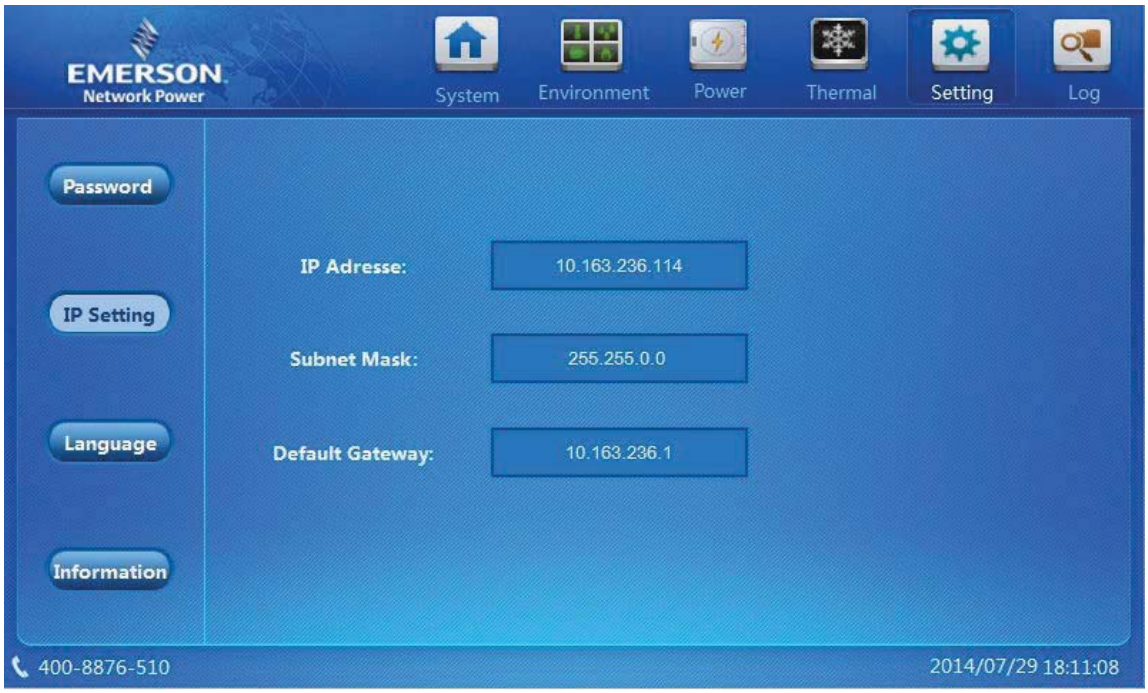


Figure 5-20 IP display

Click the input box, after login by using admin, the setting input box pops up. Type the IP address in character string format, and click the **Enter** button, the page shown in Figure 5-21 pops up. Click the **Set** button, the IP address will be sent to the control system for setting new IP.

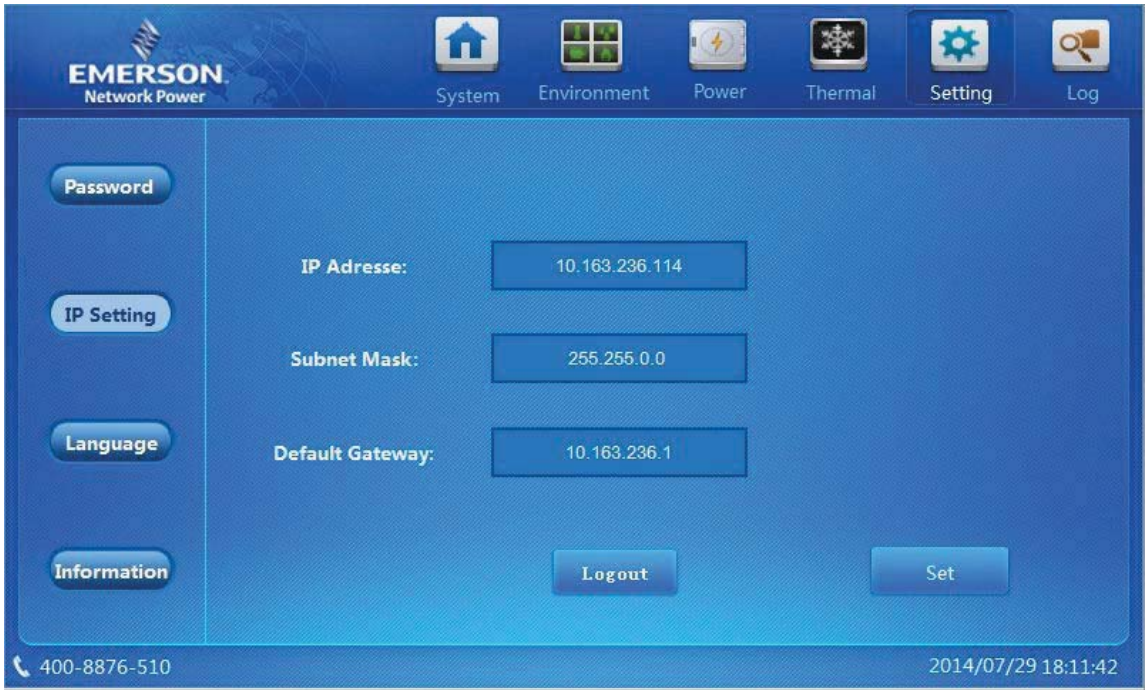


Figure 5-21 IP setting

On the page shown in Figure 5-21, you can configure the network parameters of the MSC-C background monitoring unit, such as **IP Address**, **Subnet Mask** and **Default Gateway**, click the **Set** button to make the parameters effect.

Note

After modifying the IP address, if you want to visit the MSC-C through network mode, please use the new IP address for login.

Language

Click the **Language** submenu under the **Setting** menu, the page shown in Figure 5-22 pops up. You can click the **English** button to select English display.

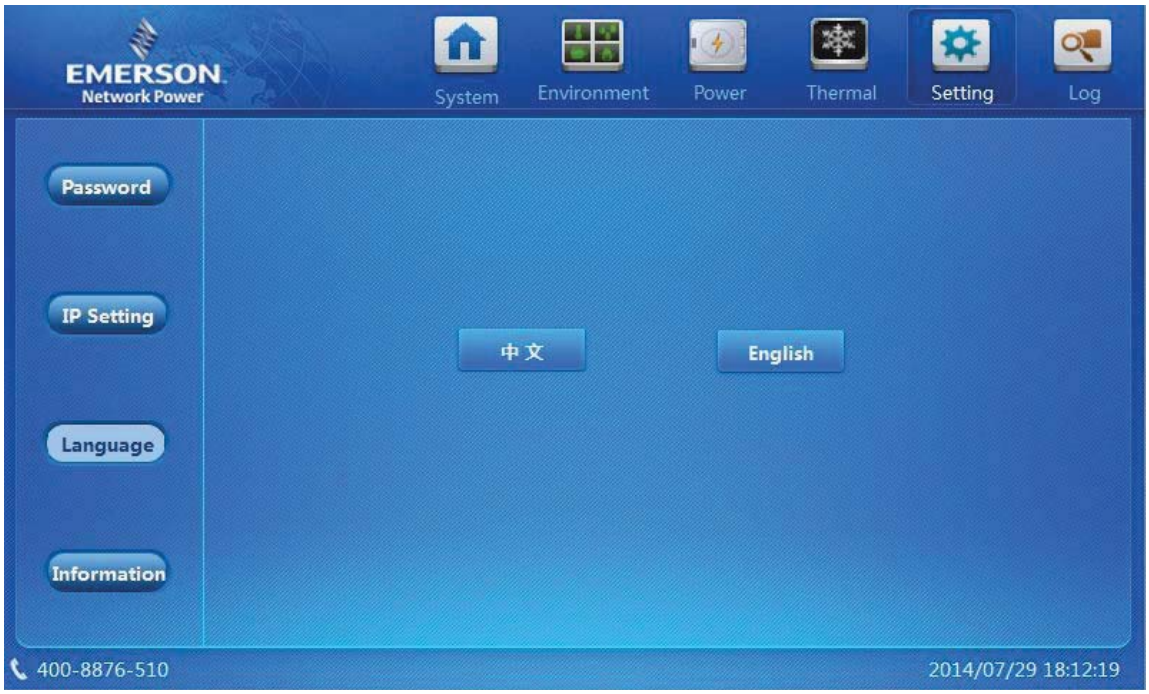


Figure 5-22 Language setting

Information

Click the **Information** submenu under the **Setting** menu, the page shown in Figure 5-23 pops up. Through the page, you can view the current system information, including **System Name**, **Hardware Version**, **Software Version**, **Serial Number** and **Service Hotline**.

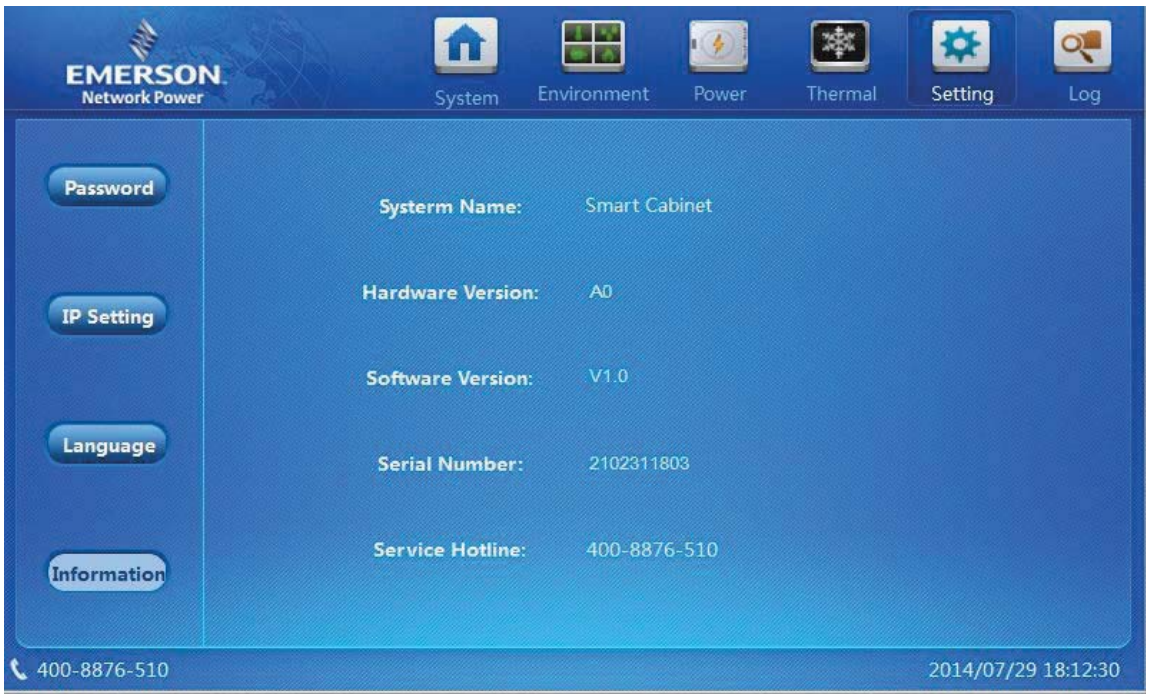


Figure 5-23 Information page

5.4.6 Log

Alarm management

1. Display an alarm

On any page, if the current system has an alarm, in the lower part of the page, an alarm rolling bar will appear to display the current alarm, as shown in Figure 5-24.

Figure 5-24 Alarm information

When the system has an alarm, there will be an alarm sound. If you want to turn off the alarm sound, click the button. Click the alarm rolling bar, the page will jump to the real-time alarm page, as shown in Figure 5-25.

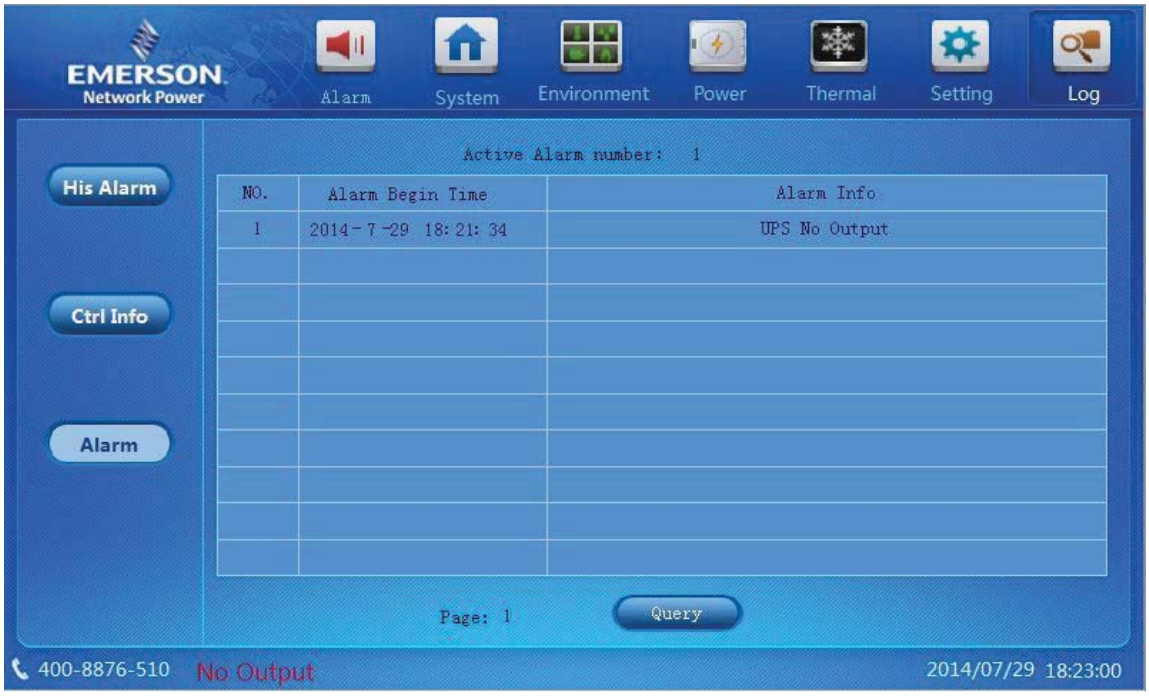


Figure 5-25 Real-time alarm page

2. History alarm

Click the **His Alarm** submenu under the **Log** menu to view the historical alarms, as shown in Figure 5-26. You can query the historical alarms within a week.

EMERSON
Network Power
System
Environment
Power
Thermal
Setting
Log
His Alarm
Ctrl Info
Alarm
Hisalarm number: 10
NO. Alarm Begin Time Alarm End Time Alarm Info
1 2014-7-29 17:58:42 2014-7-29 17:58:51 UPS Communication Failure Alarm
2 2014-7-29 17:56:28 2014-7-29 17:56:55 AC Communication failure
3 2014-7-29 17:54:6 2014-7-29 17:54:6 AC Communication failure
4 2014-7-29 17:53:54 2014-7-29 17:54:22 PDU Communication Failure Alarm
5 2014-7-29 17:32:47 2014-7-29 17:36:42 Utility Voltage Freq Abnormal
6 2014-7-29 17:32:37 2014-7-29 17:34:20 UPS Battery Self Testing
7 2014-7-29 17:32:37 2014-7-29 17:34:44 UPS No Output
8 2014-7-28 10:15:18 2014-7-29 17:32:37 UPS Communication Failure Alarm
9 2014-7-28 10:14:47 2014-7-29 17:28:38 AC Communication failure
10 2014-7-28 10:14:41 2014-7-29 17:26:37 PDU Communication Failure Alarm
Page: 1
Query
400-8876-510
2014/07/29 18:12:52

Figure 5-26 Historical alarm page

Ctrl Info

Click the **Ctrl Info** submenu under the **Log** menu to view the historical control records, as shown in Figure 5-27. You can query the historical control information within a week.

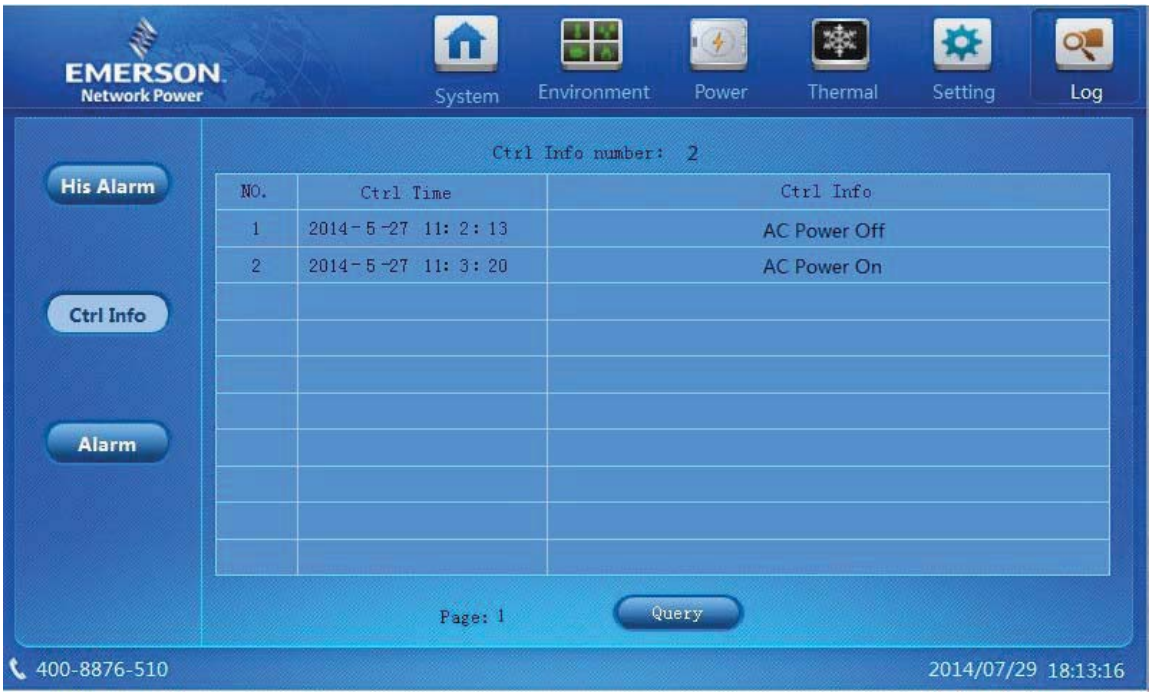


Figure 5-27 Control information page

Chapter 6 Web Page Of MSC-C

This chapter introduces how to log in the MSC-C through Web and relevant functions of the MSC-C.

6.1 Login Preparation

To ensure that the MSC-C page function can be normally used, please refer to this section for selecting and setting browser options.

6.1.1 Checking IP Address Connectivity

Before logging in MSC-C through Web, please first confirm the IP address of MSC-C, and test its connectivity. Refer to Q1 in *FAQ* in *7.2.1 MSC-C Maintenance* for the test method.

6.1.2 Checking Browser Version

The recommended browser version includes: **IE7**, **IE8**, **IE9** or **IE10**.

6.1.3 Checking Browser Setting

Checking IE General setting

Double-click the icon of IE to run the software, click the menus of **Tools** -> **Internet Options**, then click the **Settings** button on the **General** tab, and select **Every time I visit the webpage** for **Check for newer versions of stored pages**, as shown in Figure 6-1.

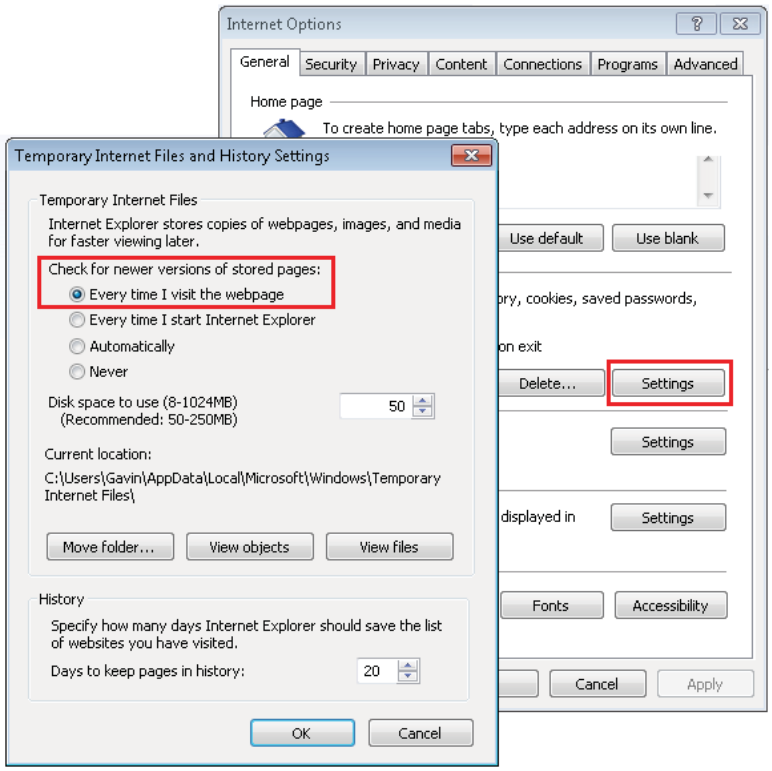


Figure 6-1 General setting

Checking IE proxy setting

1. Double-click the icon of IE to run the software, click the menus of **Tools** -> **Internet Options** and then choose the **Connections** tab to pop up the window shown in Figure 6-2.

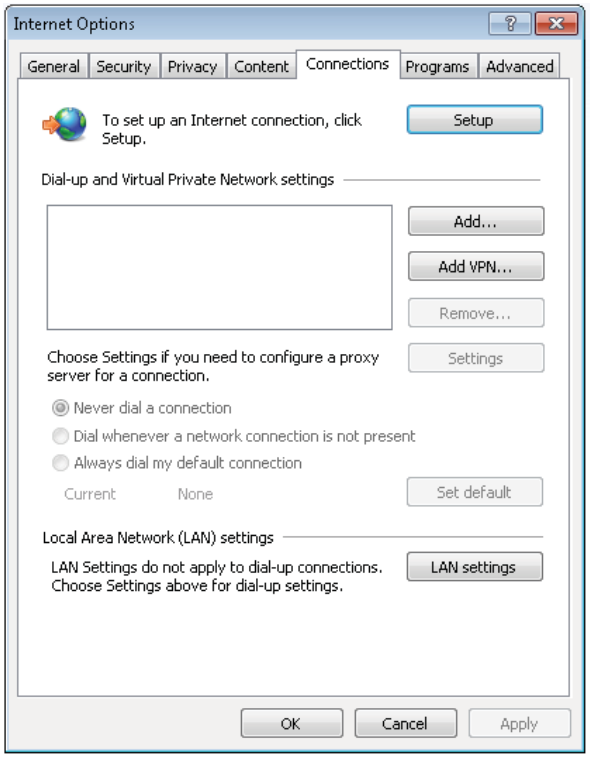


*Figure 6-2 Choosing the **Connections** tab*

2. In the window shown in Figure 6-2, click the button **LAN Settings** to pop up the window shown in Figure 6-3.

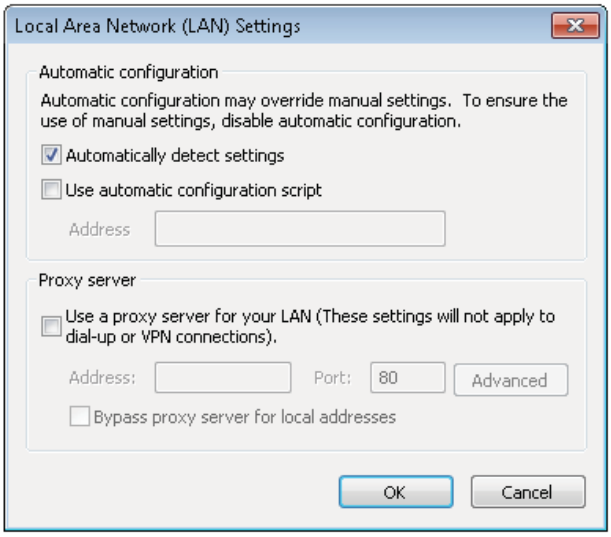

Local Area Network (LAN) Settings
Automatic configuration
Automatic configuration may override manual settings. To ensure the use of manual settings, disable automatic configuration.
Automatically detect settings
Use automatic configuration script
Address
Proxy server
Use a proxy server for your LAN (These settings will not apply to dial-up or VPN connections).
Address:
Port:
80
Advanced
Bypass proxy server for local addresses
OK
Cancel

Figure 6-3 LAN setting

3. Consult the network manager of your area, ask if you need to set a proxy server and get the configuration method. If there is no need to set a proxy server, do not tick any option.

Checking IE security setting

1. Double-click the icon of IE to run the software, click the menus of **Tools** -> **Internet Options** and then choose the **Security** tab to pop up the window shown in Figure 6-4.

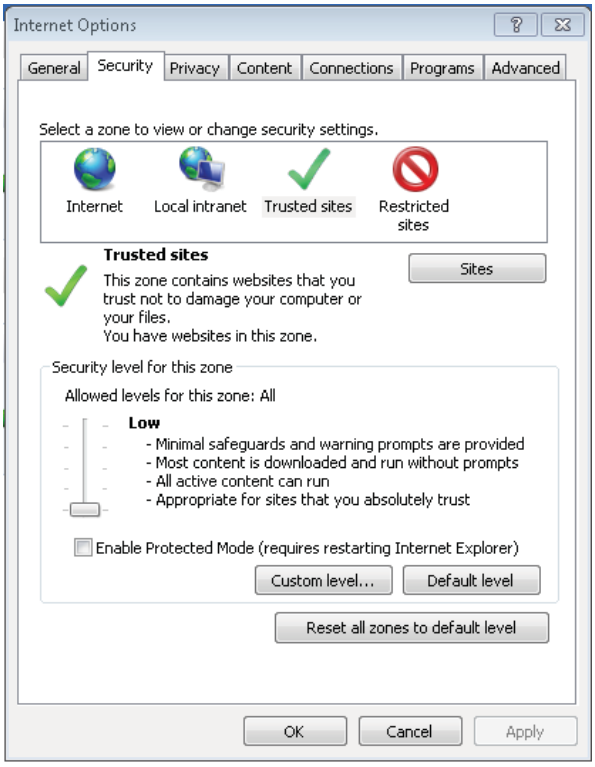


Figure 6-4 Security setting 1

2. In the window shown in Figure 6-4, choose **Trusted sites** and click the **Custom level** button to pop up the window shown in Figure 6-5.

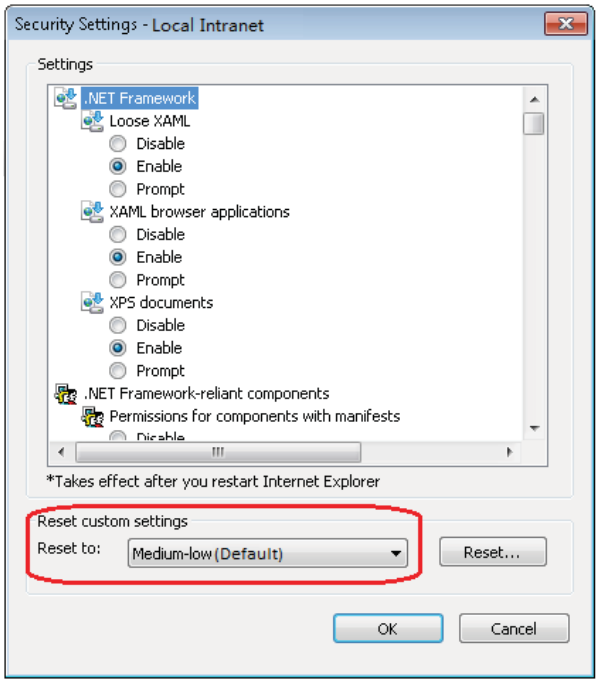


Figure 6-5 Security setting 2

3. In the window shown in Figure 6-5, set 'Medium-low' for the security level. Click the **Reset** button to finish **Reset custom settings**, at last, click **OK**.

4. In the window shown in Figure 6-6, set **Enable** for **File download**.

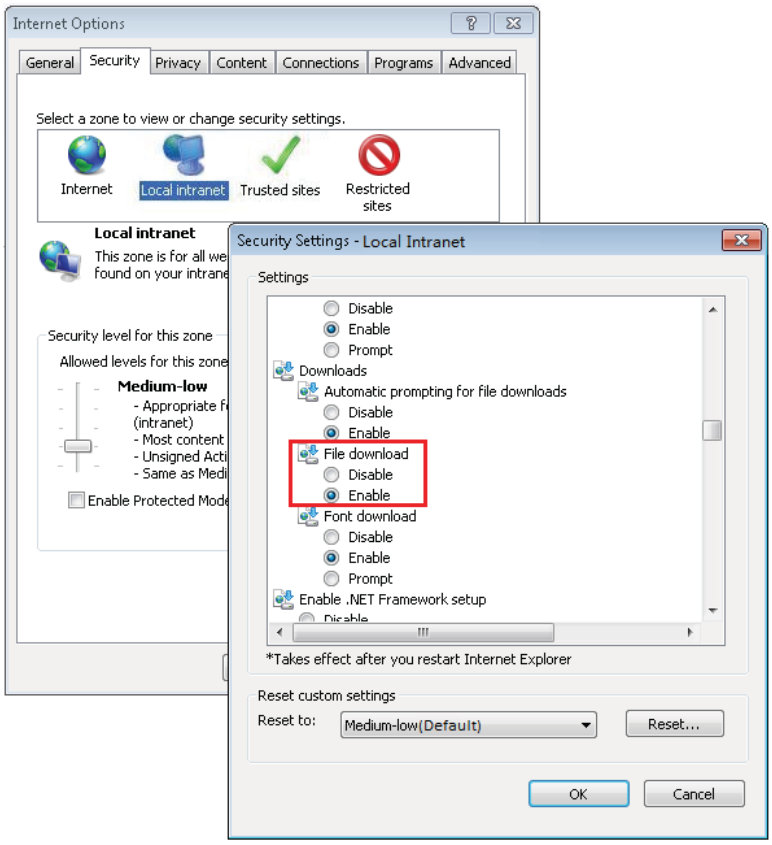


Figure 6-6 Enabling file download

5. In the window shown in Figure 6-7, set **Enable** for **Initialize and script ActiveX controls not marked as safe for scripting**.

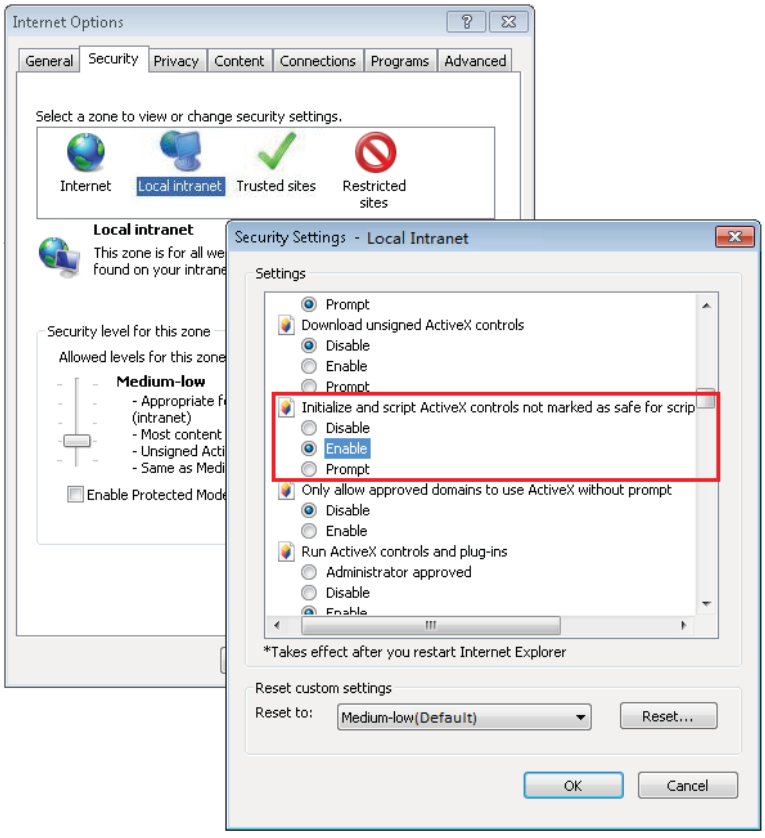


Figure 6-7 Enabling ActiveX controls

6. In the window shown in Figure 6-8, add the IP address of the MSC-C into the trusted site list.

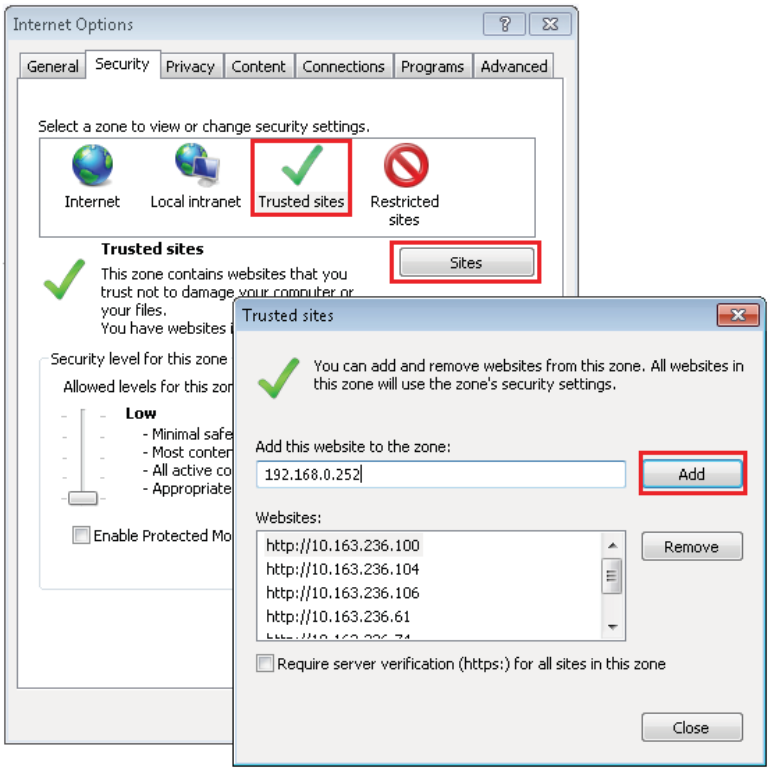


Figure 6-8 Adding trusted sites

6.2 Log In MSC-C

6.2.1 Authorizing Boot-Strap

1. When logging in MSC-C for the first time, open the IE browser, and enter the IP address of the MSC-C (the default IP is 192.168.0.252) in the address box, the authorizing boot-strap page will appear, as shown in Figure 6-9. If the authorizing boot-strap page does not appear, refer to *Q5* in *FAQ* in *7.2.1 MSC-C Maintenance*.

Figure 6-9 Authorizing boot-strap page

2. Call the customer service hotline of Emerson Network Power Co., Ltd.: 400-887-6510, tell the code to the customer service personnel, and you will get the password.

3. Type the gotten password in the textbox of **Password**, and then click **OK**. If the password is correct, the system will jump to the login page automatically (see Figure 6-10).

For overseas market, there is no need of authorizing boot-strap. The initial boot-strap page is shown in Figure 6-10.

6.2.2 Login Page

1. Open the IE browser, and enter the IP address of the MSC-C in the address box, the login page will appear, as shown in Figure 6-10. If the login page does not appear, refer to *Q3* in *FAQ* in *7.2.1 MSC-C Maintenance*..

Crystal blue *Ocean blue*

Figure 6-10 Login page of MSC-C

2. On the login page, select a preferable theme by clicking ■ or ■: ■ means crystal blue; ■ means ocean blue, as shown in Figure 6-10.

3. Type the username and password (default username: 'admin', default password: 'emerson'), and click the **Login** button, the homepage will appear, as shown in Figure 6-12. If you cannot visit the homepage after entering correct username and password, refer to *6.1.3 Checking Browser Setting* and set the IE browser again.

6.2.3 Getting Password

If you forget the password, click the **Forget Password** button on the login page, and the screen will display the page of getting password, as shown in Figure 6-11.

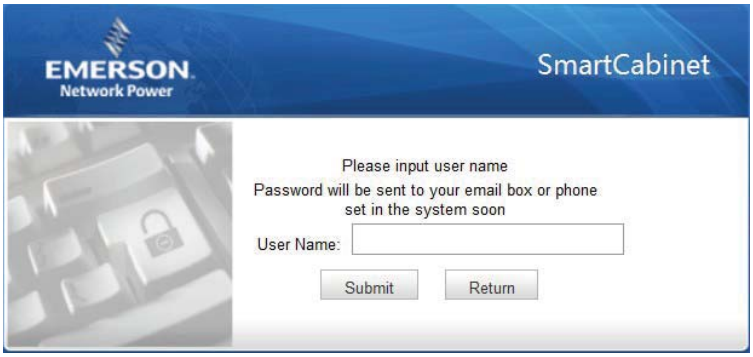


Figure 6-11 Page of getting password

Type your username, and click the **Get Password** button, your password will be sent to the email box or phone which you have configured before. Clicking the **Return Login** button cancels the operation.

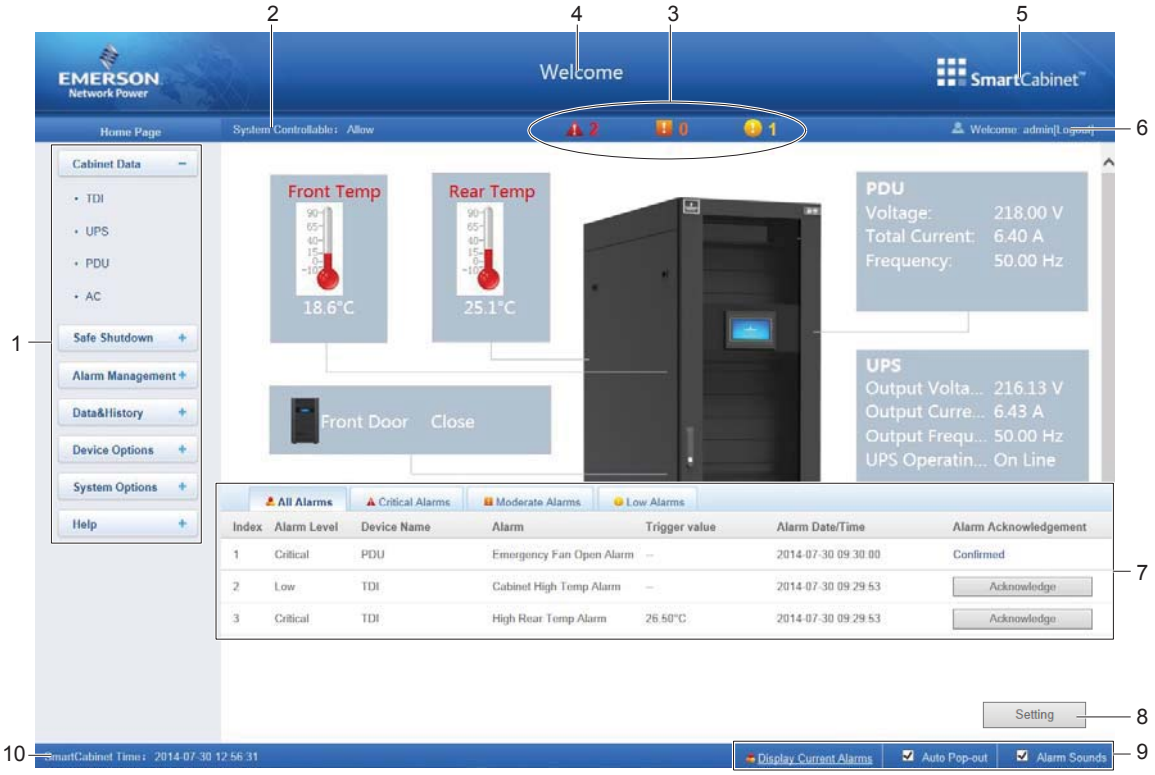
Note

1. Only when you have correctly configured the email and SMS parameters on the **SMS and Email Server Configuration** page can you receive the password sent by the system. Refer to *Alarm Notification* in *6.4.3 Alarm Management* for detailed setting method.

2. The gotten password is a random new password generated by the system; please modify the password after logging in the system successfully.

6.3 Homepage Of MSC-C

After successful login, the homepage of MSC-C is displayed by default, as shown in Figure 6-12.



1. Menu item
2. Controllable status
3. Current number of every level alarm
4. System title
5. Logo
6. [User] Logout
7. Real-time alarm displaying list
8. **Setting** button (hidden under the list)
9. Alarm pop-out setting
10. Time calibrating link

Figure 6-12 Homepage of MSC-C (by location)

Note

When the system is operating abnormally, a corresponding fault or alarm will occur. The emergency ventilation system can prevent continuous temperature rise inside the cabinet within a short time. If the high temperature fault or alarm has not been eliminated for a long time, you need to go to the field and open the front and rear doors of the cabinet, meanwhile, contact the customer service personnel for troubleshooting.

6.3.1 Setting Homepage

Clicking the **Setting** button shown in Figure 6-12 enters setting status of the homepage, as shown in Figure 6-13.

Figure 6-13 Setting page

After the homepage enters setting status, the setting method is as follows:

1. Display setting

Click the **Set Display** button, the window shown in Figure 6-14 pops up.

After select the device name, the device signals will be displayed in the lower box. You can select the device signals to be displayed according to your needs, however, the selected signals cannot exceed 4. At last, click **OK**.

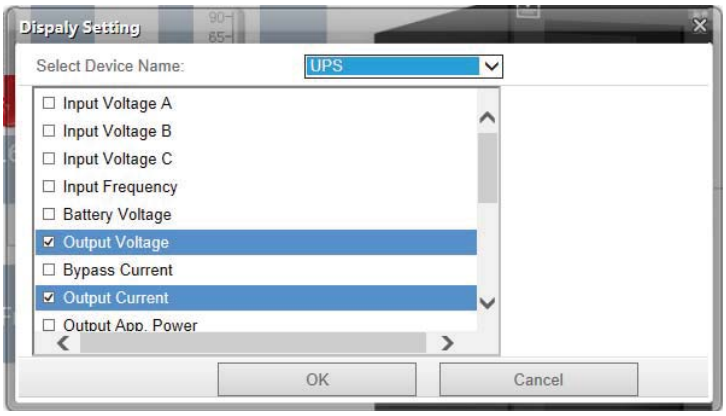


Figure 6-14 Display setting

Note

There is no need of setting the display mode of temperature, humidity and 4DI signals, and the effective signals will be directly displayed on the page.

2. Save

Click the **Save** button, all configuration will be saved and the page returns to view status.

3. Back

Click the **Back** button, the homepage will return to view status from setting status.

Note

1. Only after you click the **Save** button, the configuration can take effect and be displayed.
2. If you click the **Back** button directly after configuration, all configuring information will be lost.

6.3.2 Time Calibrating Link

The lower left part displays the system time of SmartCabinet. Clicking the **SmartCabinet system time** will jump to the time calibrating page. For detailed operation, refer to *Date/Time Setting* in *6.4.6 System Options*.

6.3.3 Clearing Time-Out

When there is no operation on the page within 15min, the page will become uncontrollable, as shown in Figure 6-15.

Figure 6-15 Controllable status

Click **[Clear] Time-out**, the input box shown in Figure 6-16 will appear. After typing the password, the controllable status will become normal after about 5s.

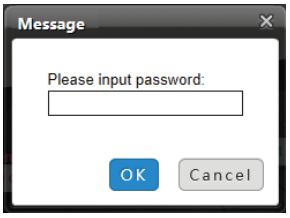


Figure 6-16 Dialog box of Security authentication

6.3.4 Logout

Click the **Logout** link at the upper right corner of the homepage, the prompt box shown in Figure 6-17 will appear, clicking **OK** will log out safely.

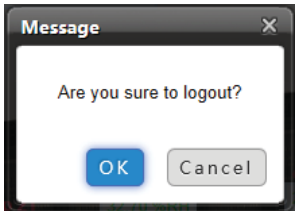


Figure 6-17 Logout

6.3.5 Real-Time Alarm Pop-Up Setting

The real-time alarm displaying list is contracted on the bottom of the page by default. You can perform the following operation by referring to Figure 6-12:

1. Click **Display/Hide Current Alarm** manually, and the real-time alarm displaying list will pop up;
2. Tick **Auto Pop-out**, and the real-time alarm displaying list will pop up when an alarm is generated;
3. Tick **Alarm Sounds**, and the system will play alarm sound through the browser when an alarm is generated.

6.4 Menu Items

On the homepage of MSC-C, the menu items include **Cabinet Data**, **Safe Shutdown**, **Alarm Management**, **Data&History**, **Device Options**, **System Options** and **Help**.

6.4.1 Cabinet Data

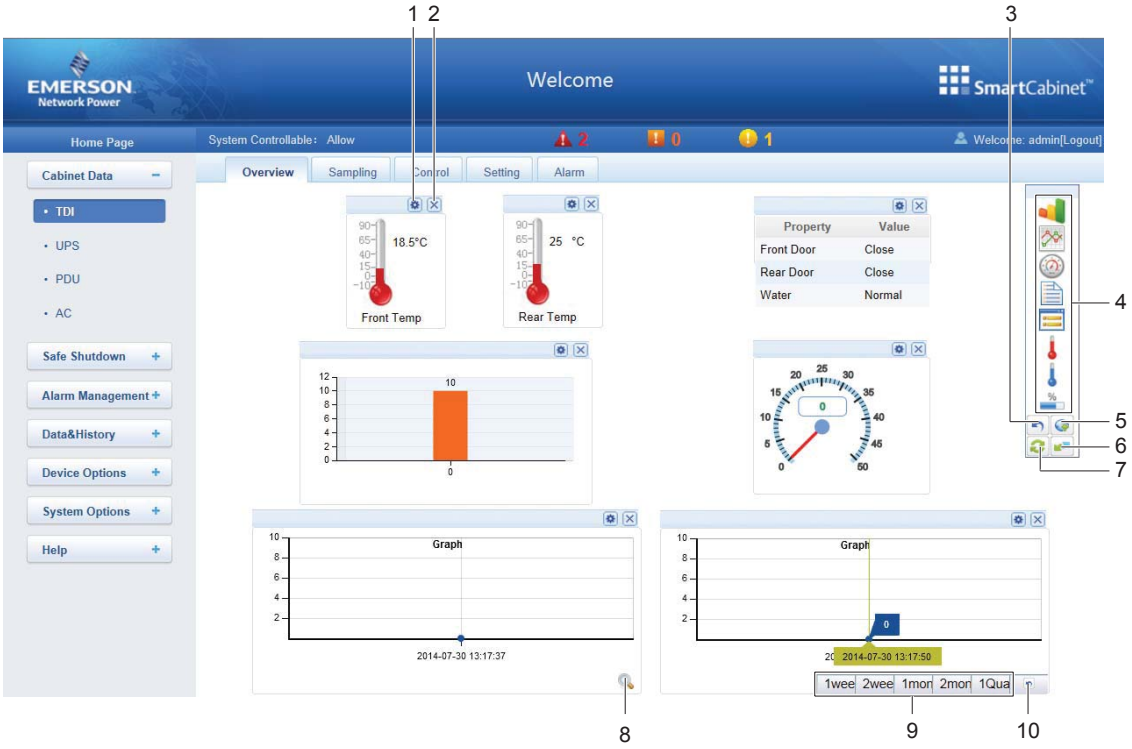
Click the **Cabinet Data** menu in the left, the submenus will appear. When you click the specific device, the right part will display the relative information of the device, including **Overview**, **Sampling**, **Control**, **Setting** and **Alarm**.

Note

TDI in **Cabinet Data** is a dummy device, which indicates all temperature sensors, temperature and humidity sensors and 4DI sensors connected to MSC-C, and the name cannot be changed.

Overview

Click the **Overview** tab, and click the **Edit** button, you can define the overview page, as shown in Figure 6-18.



1. Signal configuration icon
2. Remove component icon
3. Back to browse icon
4. Component list
5. Save icon
6. 'Effective to same type of equipment' icon
7. Restore icon
8. View history chart icon
9. History data selection icon
10. View real chart icon

*Figure 6-18 **Overview** tab*

In editing status, clicking the icon can restore default; clicking the icon can configure the same type of other devices; click the icon can save the configuration; click the icon can return to view status.

Note

1. The **Overview** page has different default display mode of components for different device type, and clicking the restore icon will restore to this state.

2. Certain types of devices (such as air conditioner, UPS) have special status charts, which cannot be deleted or configured. However, the locations of these status charts can be changed.

Sampling

Clicking the **Sampling** tab can enter the sampling page, which displays sampling signals of selected device, as shown in Figure 6-19.

Figure 6-19 Sampling signals

If some signal is in alarm status, it will be displayed in red.

Control

Clicking the **Control** tab can enter the control page, which displays control signals of selected device, as shown in Figure 6-20.

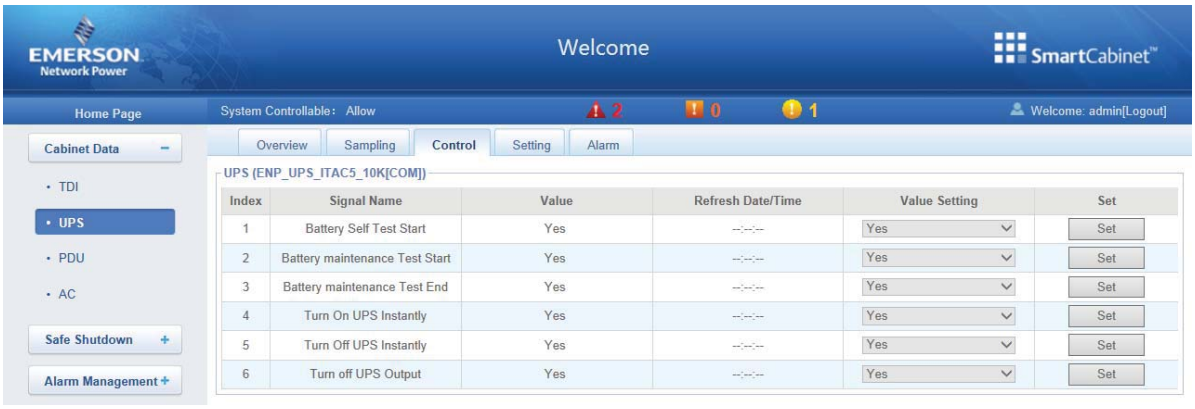


Figure 6-20 Control signals

Select an option from the drop-down box of **Value Setting**, and click the **Set** button to control the device.

Setting

Clicking the **Setting** tab can enter the setting page, which displays setting signals of selected device, as shown in Figure 6-21.

Figure 6-21 Setting signals

You can set several signals at the same time, and at most 16 signals can be set at the same time for each time.

Note

The TDI device only displays effective setting signals, however, other devices displays all setting signals.

Alarm

Clicking the **Alarm** tab can enter the alarm page, which displays alarm signals of selected device, as shown in Figure 6-22.

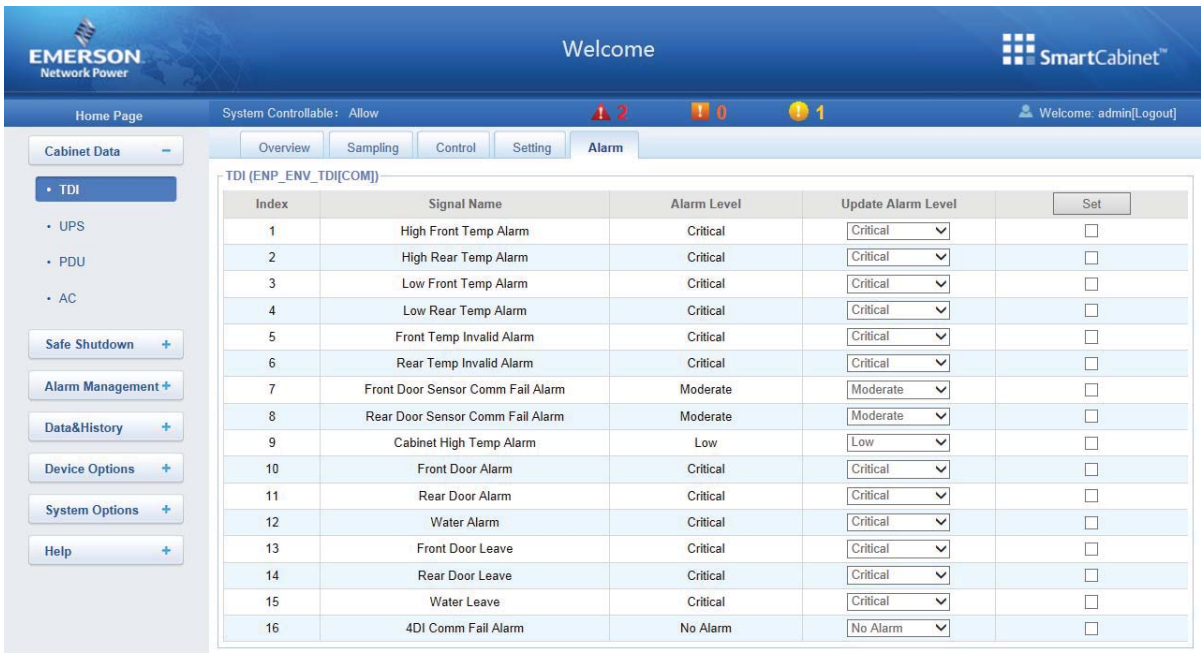


Figure 6-22 Alarm signals

You can set alarm level of several alarm signals at the same time, and at most 16 signals can be set at the same time for each time.

Note

The TDI device only displays effective alarm signals, however, other devices displays all alarm signals.

6.4.2 Safe Shutdown

On the MSC-C homepage, click the **Safe Shutdown** menu on the left, two submenus appear, including **Shutdown Schedule** and **Server Shutdown**.

Shutdown Schedule

Click **Shutdown Schedule** submenu under the **Safe Shutdown** menu, the page shown in Figure 6-23 pops up.

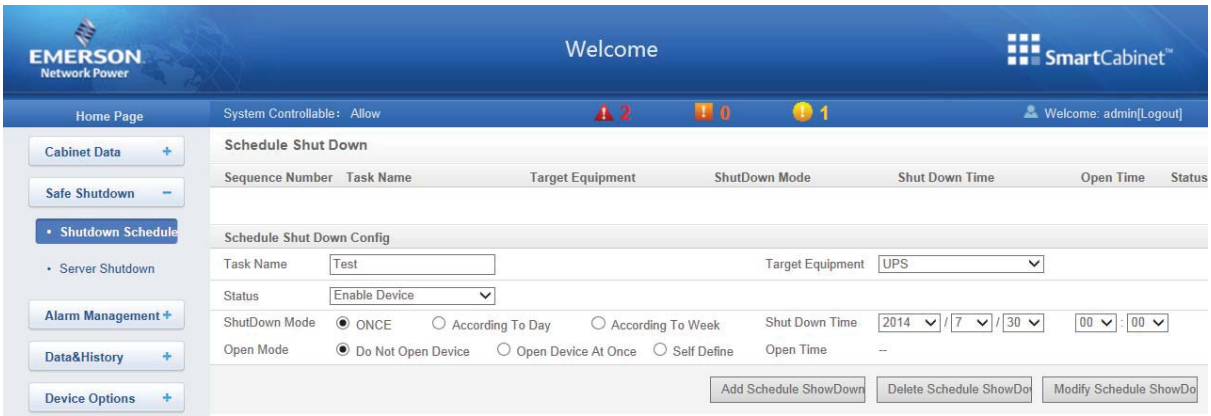


Figure 6-23 Shutdown Schedule page

The Shutdown Schedule page is used to add, delete and modify schedule shutdown task of UPS devices.

As shown in Figure 6-23, type a task name of schedule shutdown in the field of **Task Name**, select a **Target Equipment**, select whether to enable the task in the **Status** field, select **ShutDown Mode** and **Open Mode**, and then add **Open Time** according to the corresponding prompt.

Click the **Add Schedule Shutdown** button, the task will be successfully added. As shown in Figure 6-24, a new task has been added in the schedule shutdown task list. The tasks in the task list will be executed automatically according to their Enable/Disable status.

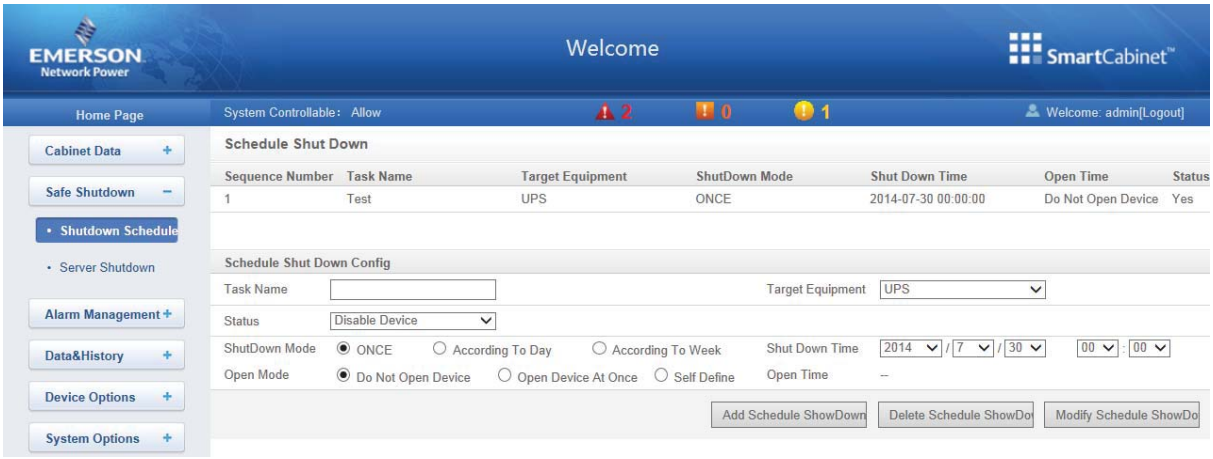


Figure 6-24 Schedule shutdown task list

The descriptions about the MSC-C schedule shutdown function are as follows:

1. When the **Open Mode** is set to 'Do Not Open Device' or 'Open Device At Once', the Open Time cannot be set, and it is displayed as '--';

2. The format of **Shut Down Time** changes with different options of **ShutDown Mode** automatically.

Note

1. The MSC-C can support up to ten shutdown tasks.

2. Only when 'Enable Device' is set for **Field** can the schedule shutdown task be enabled.

Server Shutdown

Click **Server Shutdown** submenu under the **Safe Shutdown** menu, the Server Shutdown page will pop up, as shown in Figure 6-25.

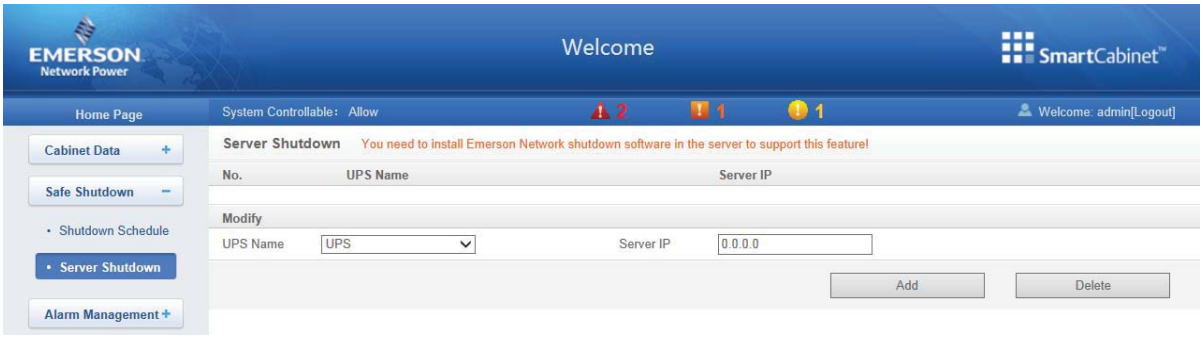


Figure 6-25 Server Shutdown page

On the Server Shutdown page, you can add and delete server shutdown task.

The procedures for adding a server shutdown task are as follows:

1. Select a UPS from the drop-down box of **UPS Name**;

2. In the **Server** IP field, type the IP address of the server to be closed;

3. Click the **Add** button, the server shutdown task is added.

Note

If you want to use the server shutdown function, please install 'Emerson network shutdown' software in the server.

The procedures for deleting a server shutdown task are as follows:

Select the task to be deleted in the server shutdown task list, and click the **Delete** button to finish the operation.

6.4.3 Alarm Management

The Alarm Management menu supplies alarm centralized management function, enabling you of self-defining alarm notification and alarm linkage rules, and viewing historic alarm.

On the MSC-C homepage, click the **Alarm Management** menu on the left, four submenus appear, including **Current Alarm**, **History Alarm**, **Alarm Notification** and **Alarm Actions**.

Current Alarms

Click **Current Alarms** submenu under the **Alarm Management** menu, or refer to *6.3.5 Real-Time Alarm Pop-Up Setting*, the current alarm list will pop up, as shown in Figure 6-26.

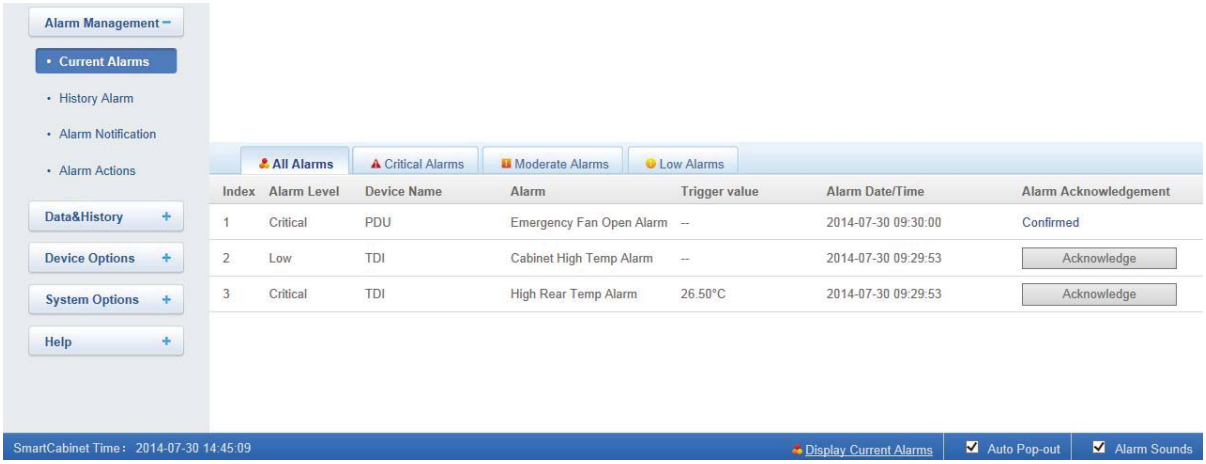


Figure 6-26 Current alarms

1. You can click the tabs above the alarm list to view current alarms according to alarm levels.

2. Click the **Acknowledge** button to confirm the alarm. The confirmed alarm will not participate in alarm linkage, and the alarm notification is sent once only.

3. When the mouse is located on the **Confirmed** link, the alarm confirming information will be hovered; when you move the mouse, the information will disappear, as shown in Figure 6-27.

Figure 6-27 Confirming information

History Alarm

Click **History Alarm** submenu under the **Alarm Management** menu to look over historical alarm records., Select a device (for instance, 'All Device') and set the start time and end time (for instance, from 2014-07-30 00:00:00 to 2014-07-30 23:59:59). Then click the **Query** button, all alarm records generated between the start time and end time will be listed, including: **Index**, **Device Name**, **Signal Name**, **Alarm Level**, **Trigger valve**, **Start Date/Time**, **Confirmed by**, **Confirmed on Date/Time** and **End Date/Time**, as shown in Figure 6-28.

Click the **Download** button to download the query results.

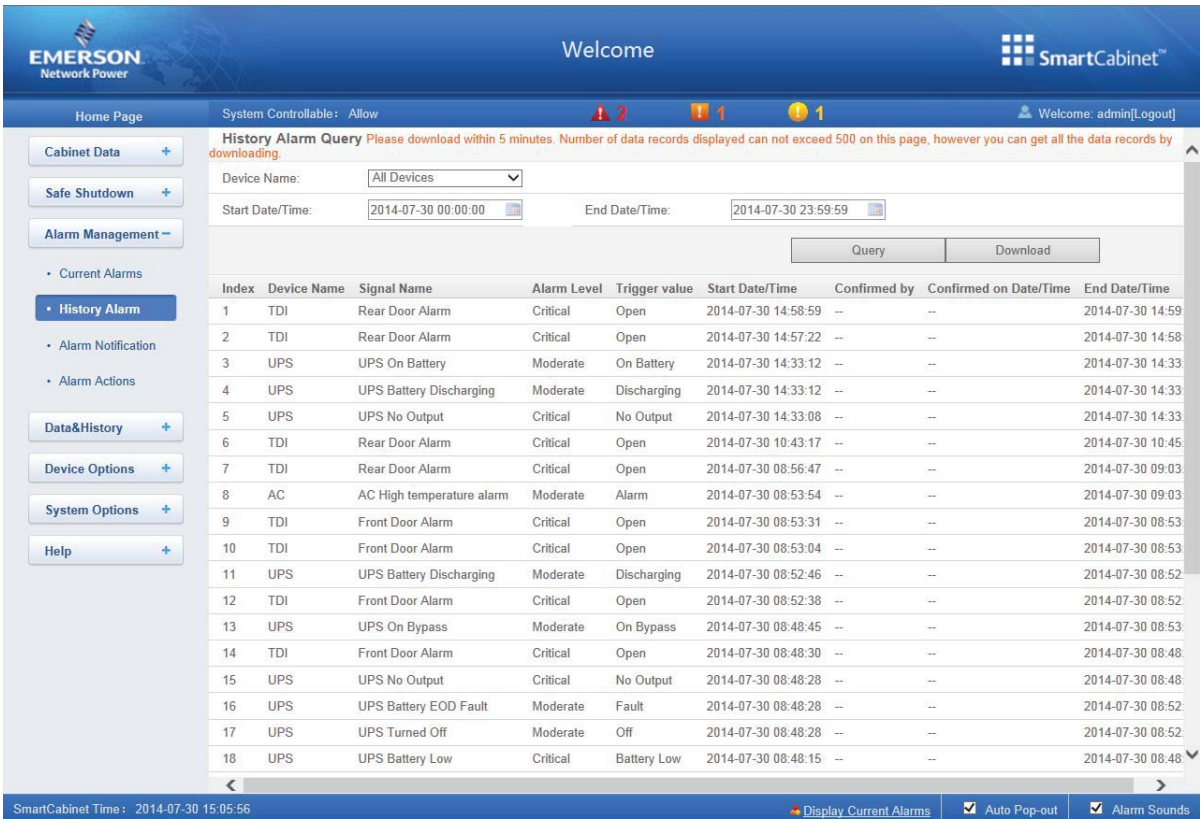

EMERSON Network Power
Welcome
SmartCabinet
Home Page
System Controllable: Allow
Welcome: admin[Logout]
Cabinet Data
Safe Shutdown
Alarm Management
Current Alarms
History Alarm
Alarm Notification
Alarm Actions
Data&History
Device Options
System Options
Help
History Alarm Query Please download within 5 minutes. Number of data records displayed can not exceed 500 on this page, however you can get all the data records by downloading.
Device Name: All Devices
Start Date/Time: 2014-07-30 00:00:00
End Date/Time: 2014-07-30 23:59:59
Query
Download
Index Device Name Signal Name Alarm Level Trigger value Start Date/Time Confirmed by Confirmed on Date/Time End Date/Time
1 TDI Rear Door Alarm Critical Open 2014-07-30 14:58:59 -- -- 2014-07-30 14:59
2 TDI Rear Door Alarm Critical Open 2014-07-30 14:57:22 -- -- 2014-07-30 14:58
3 UPS UPS On Battery Moderate On Battery 2014-07-30 14:33:12 -- -- 2014-07-30 14:33
4 UPS UPS Battery Discharging Moderate Discharging 2014-07-30 14:33:12 -- -- 2014-07-30 14:33
5 UPS UPS No Output Critical No Output 2014-07-30 14:33:08 -- -- 2014-07-30 14:33
6 TDI Rear Door Alarm Critical Open 2014-07-30 10:43:17 -- -- 2014-07-30 10:45
7 TDI Rear Door Alarm Critical Open 2014-07-30 08:56:47 -- -- 2014-07-30 09:03
8 AC AC High temperature alarm Moderate Alarm 2014-07-30 08:53:54 -- -- 2014-07-30 09:03
9 TDI Front Door Alarm Critical Open 2014-07-30 08:53:31 -- -- 2014-07-30 08:53
10 TDI Front Door Alarm Critical Open 2014-07-30 08:53:04 -- -- 2014-07-30 08:53
11 UPS UPS Battery Discharging Moderate Discharging 2014-07-30 08:52:46 -- -- 2014-07-30 08:52
12 TDI Front Door Alarm Critical Open 2014-07-30 08:52:38 -- -- 2014-07-30 08:52
13 UPS UPS On Bypass Moderate On Bypass 2014-07-30 08:48:45 -- -- 2014-07-30 08:53
14 TDI Front Door Alarm Critical Open 2014-07-30 08:48:30 -- -- 2014-07-30 08:48
15 UPS UPS No Output Critical No Output 2014-07-30 08:48:28 -- -- 2014-07-30 08:48
16 UPS UPS Battery EOD Fault Moderate Fault 2014-07-30 08:48:28 -- -- 2014-07-30 08:52
17 UPS UPS Turned Off Moderate Off 2014-07-30 08:48:28 -- -- 2014-07-30 08:52
18 UPS UPS Battery Low Critical Battery Low 2014-07-30 08:48:15 -- -- 2014-07-30 08:48
SmartCabinet Time: 2014-07-30 15:05:56
Display Current Alarms
Auto Pop-out
Alarm Sounds

Figure 6-28 History alarm query

Alarm Notification

1. Alarm Notification Configuration

Click the **Alarm Notification** submenu under the **Alarm Management** menu, the page shown in Figure 6-29 pops up. You can choose the notification method to receive notification of chosen level alarm from chosen equipment, meanwhile, you can also choose the language of alarm notification information and customize the alarm content (including Equip name, Alarm description, Alarm TIME and Alarm state by default).

Click the **Save** button to finish the alarm configuration. When an alarm is generated, the system will notify users through the chosen notification method.

Note

1. Users must tick the notification method first in the **Notification by** check boxes, and then the alarm table below can be edited;
2. When all devices are chosen, all devices will be configured with the same alarm level;
3. When low level alarm is chosen, the alarm level above this level will also be chosen;
4. When some device is chosen, the highest level **Critical Alarm** will be chosen by default.

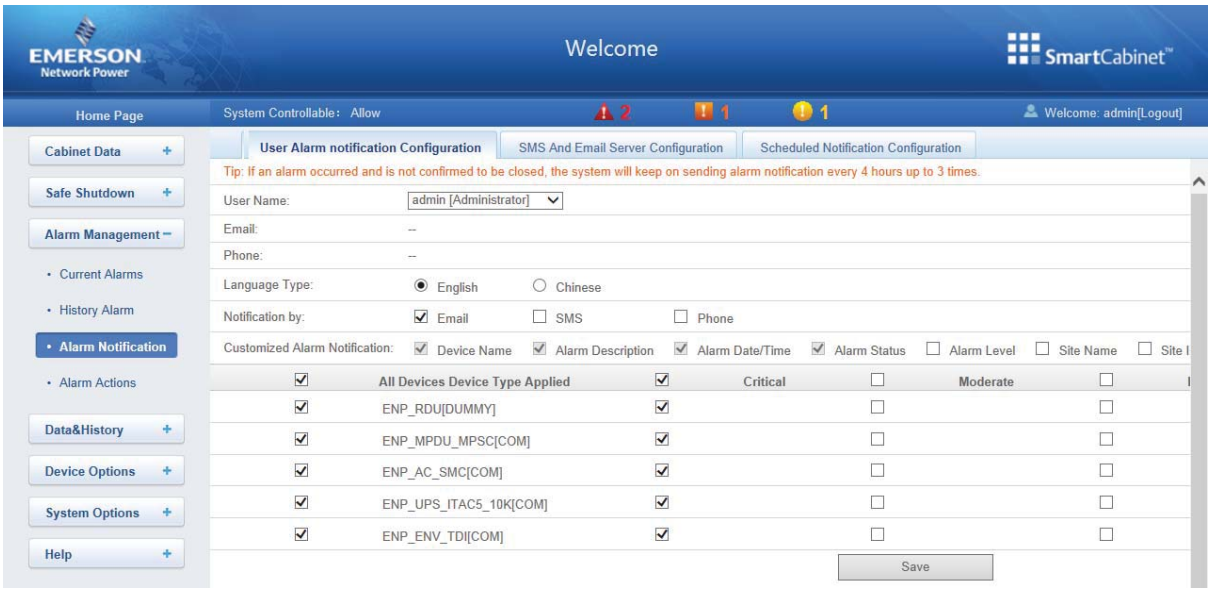


Figure 6-29 Alarm notification configuration

2. SMS/Email Server Configuration

Click the **Alarm Notification** submenu under the **Alarm Management** menu, and then click the **SMS/Email Server Configuration** tab, the page shown in Figure 6-30 pops up.

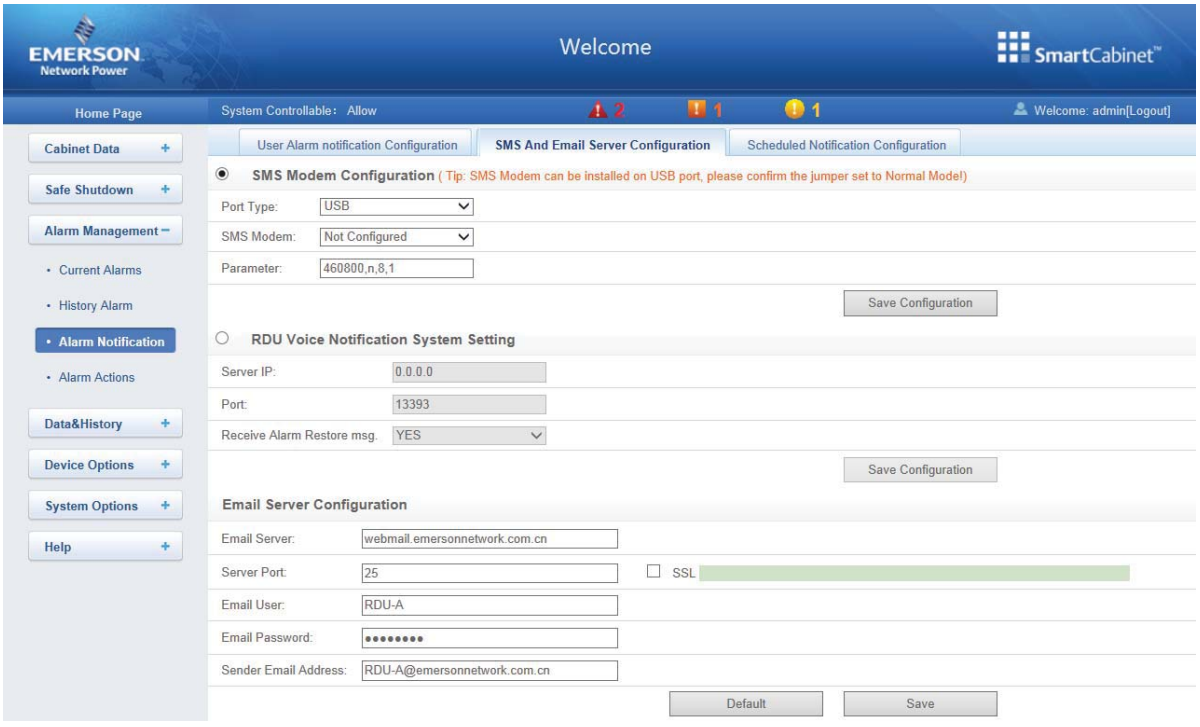


Figure 6-30 SMS/Email server configuration

On the page shown in Figure 6-30, you can perform **SMS Modem Configuration** and **RDU Voice Notification System Setting** for alarm notification reminding through SMS or phone, you can also perform **Email Server Configuration** for alarm notification reminding through email, the procedures are as follows:

- SMS Modem Configuration

1) Connect an SMS Modem through USB port according to need, and choose **Port Type**, the page will display **Parameter** automatically;

2) Choose **SMS Modem** (GPRS/CDMA) according to the SMS Modem type;

3) Set the communication parameter of the SMS Modem;

4) Click the **Save** button to save the configuration of current user's SMS Modem.

Note

If the SMS Modem is connected through USB port, you need to modify the jumper locations by referring to Table 3-7.

●RDU Voice Notification System Setting

1) Type the server IP address in the **Server IP** field;

2) Type the port number in the **Port** field, and the default is 13393;

3) Select whether to **Receive Alarm Restore msg**;

4) Click the **Save** button to save the voice notification system setting.

●Email Server Configuration

1) Type the server IP address or domain name in the **Email Server** field;

2) Type the **Server Port**, **Email User**, **Email Password** and **Sender Email Address** in the corresponding fields;

3) Click the **Save** button to save the configuration of current user's Email server.

4) Click the **Default** button to restore default setting.

Note

1. The **Server Port** is 25 by default. When SSL is chosen, the **Server Port** will become 465 automatically;
2. The **Email User** is RDU-A by default;
3. When using SSL, you need to ensure that the Email server supports SSL function.

3. Scheduled Notification Configuration

Click the **Alarm Notification** submenu under the **Alarm Management** menu, and then click the **Scheduled Notification Configuration** tab, the page shown in Figure 6-31 pops up.

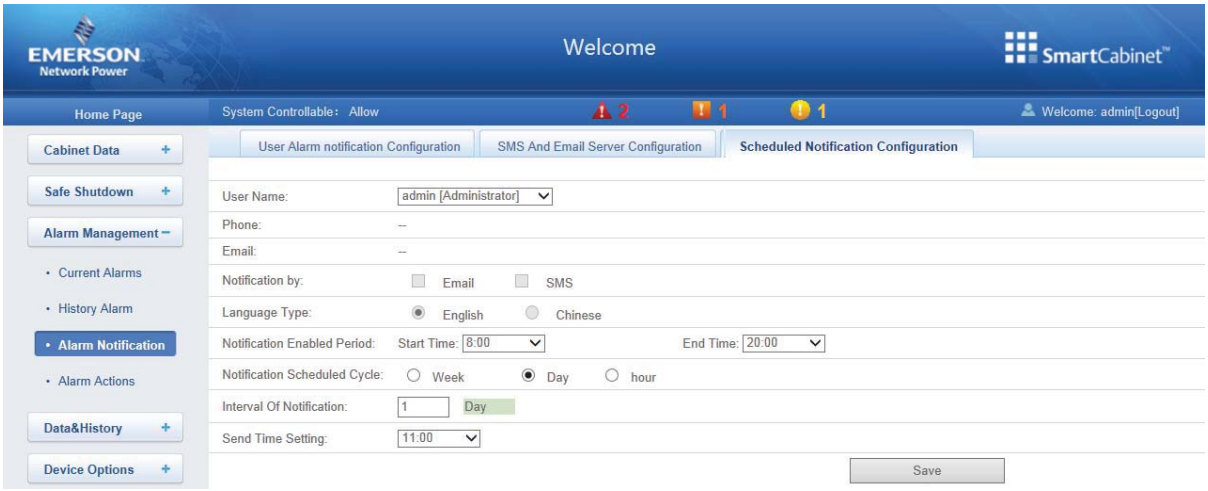


Figure 6-31 Scheduled notification configuration

Note

1. Scheduled notification configuration must be used together with alarm notification configuration; otherwise, you cannot select **User Name**, **Notification by** and **Language type**;
2. For scheduled notification configuration, the notification method 'Phone' is not supported;
3. The scheduled notification means sending the running state of the MSC-C system (normal or alarm) to the user.

1) First of all, on the **Alarm Notification Configuration** page, complete and save the setting of **User**, **Notification by** and **Language type**.

2) On the **Scheduled Notification Configuration** page, set the **Notification Enabled Period** (setting range: 8:00 ~ 20:00), **Notification Scheduled Cycle** (default: Hour), **Interval of Notification** (default: 1) and **Send Time Setting** (default: start time).

3) Click the **Save** button to save the system notification configuration.

Alarm Actions

Click the **Alarm Actions** submenu under the **Alarm Management** menu to obtain the alarm linkage function, the page shown in Figure 6-32 pops up.

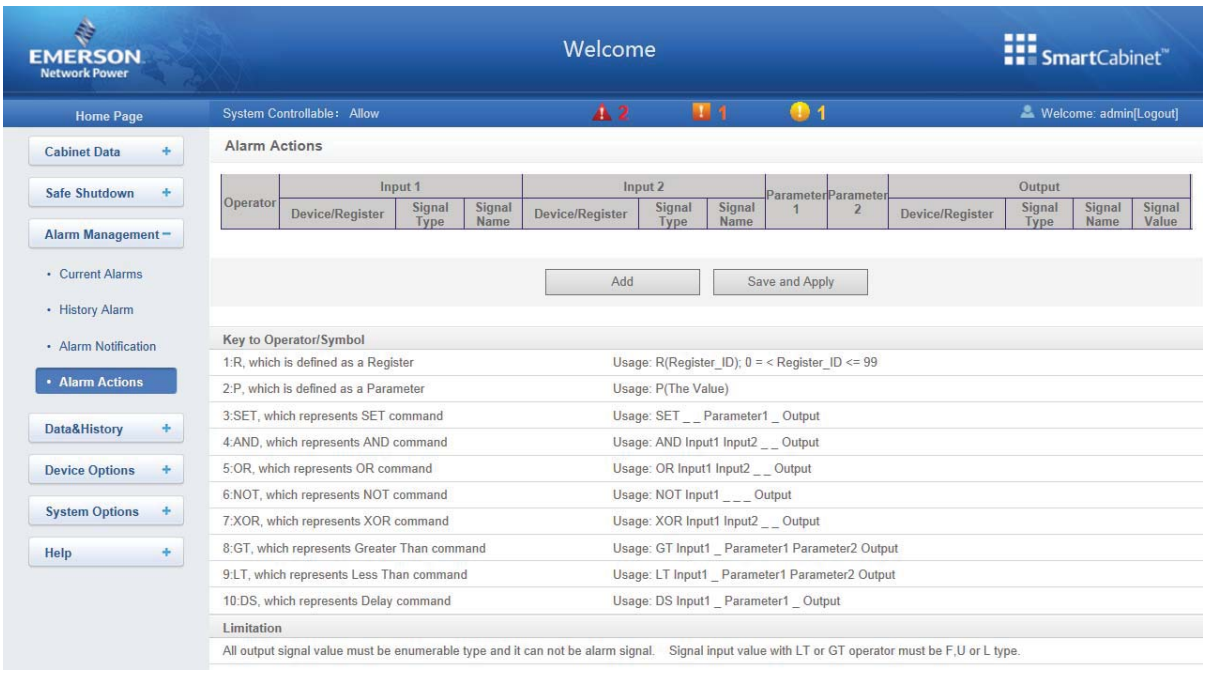

EMERSON Network Power
Welcome
SmartCabinet
Home Page
System Controllable: Allow
Welcome: admin[Logout]
Cabinet Data
Safe Shutdown
Alarm Management
Current Alarms
History Alarm
Alarm Notification
Alarm Actions
Data&History
Device Options
System Options
Help
Alarm Actions
Operator
Input 1
Input 2
Parameter 1
Parameter 2
Output
Device/Register
Signal Type
Signal Name
Signal Value
Add
Save and Apply
Key to Operator/Symbol
1:R, which is defined as a Register
Usage: R(Register_ID); 0 = < Register_ID <= 99
2:P, which is defined as a Parameter
Usage: P(The Value)
3:SET, which represents SET command
Usage: SET _ _ Parameter1 _ Output
4:AND, which represents AND command
Usage: AND Input1 Input2 _ _ Output
5:OR, which represents OR command
Usage: OR Input1 Input2 _ _ Output
6:NOT, which represents NOT command
Usage: NOT Input1 _ _ _ Output
7:XOR, which represents XOR command
Usage: XOR Input1 Input2 _ _ Output
8:GT, which represents Greater Than command
Usage: GT Input1 _ Parameter1 Parameter2 Output
9:LT, which represents Less Than command
Usage: LT Input1 _ Parameter1 Parameter2 Output
10:DS, which represents Delay command
Usage: DS Input1 _ Parameter1 _ Output
Limitation
All output signal value must be enumerable type and it can not be alarm signal. Signal input value with LT or GT operator must be F,U or L type.

Figure 6-32 Alarm linkage configuration 1

●Linkage function

As shown in Figure 6-32, the **Key to Operator/Symbol** list shows all the commands and their usages. Click the **Add** button to add new alarm linkage expression, as shown in Figure 6-33.

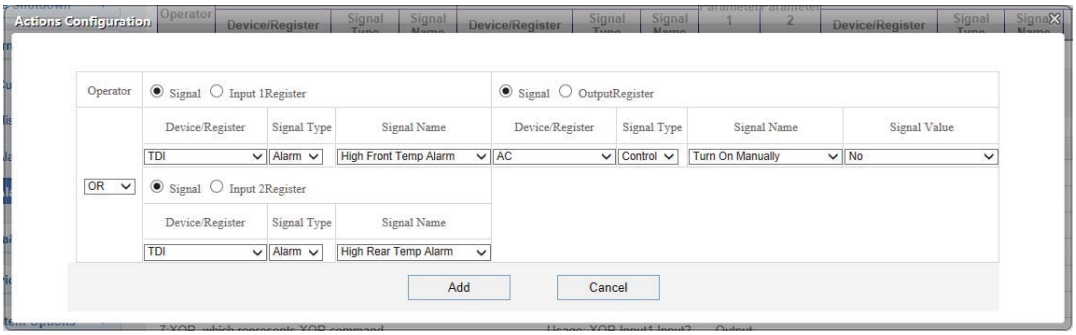


Figure 6-33 Alarm linkage configuration 2

Firstly select a command, for instance, ‘OR’. In this case, the expression is ‘signal 1 [Input1 Register] OR signal 2 [Input2 Register] = signal 3 [Output Register]’.

Secondly, when **Signal** is chosen for the input and output parameters, first choose the equip name from the drop-down lists of **Equip/Register**; then choose the signal type from the drop-down lists of **Signal Type**; at last choose the signal name from the drop-down lists of **Signal Name**; signal 1, 2, 3 can be any available signals of the MSC-C.

Thirdly, when **Register** is chosen for the parameters, users need to type the register name in the textbox of the register, for instance, R(0), R(1) and so on, as shown in Figure 6-34.

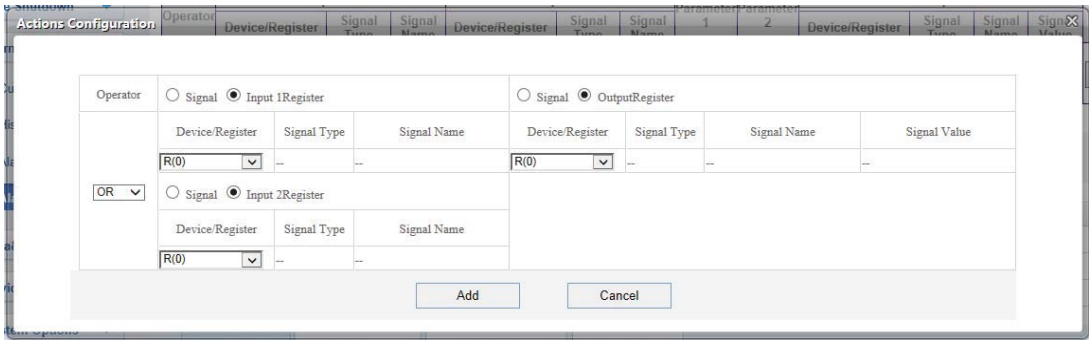


Figure 6-34 Alarm linkage configuration 3

Click the **Add** button to add the new alarm linkage expression, otherwise click the **Cancel** button.

If you click the **Add** button, as shown in Figure 6-35, an alarm linkage expression is added. Click the **Save and Apply** button to make it effective. Click the **Delete NMS** button to delete the PLC expression, and click the **Save and Apply** button to make the setting effective.

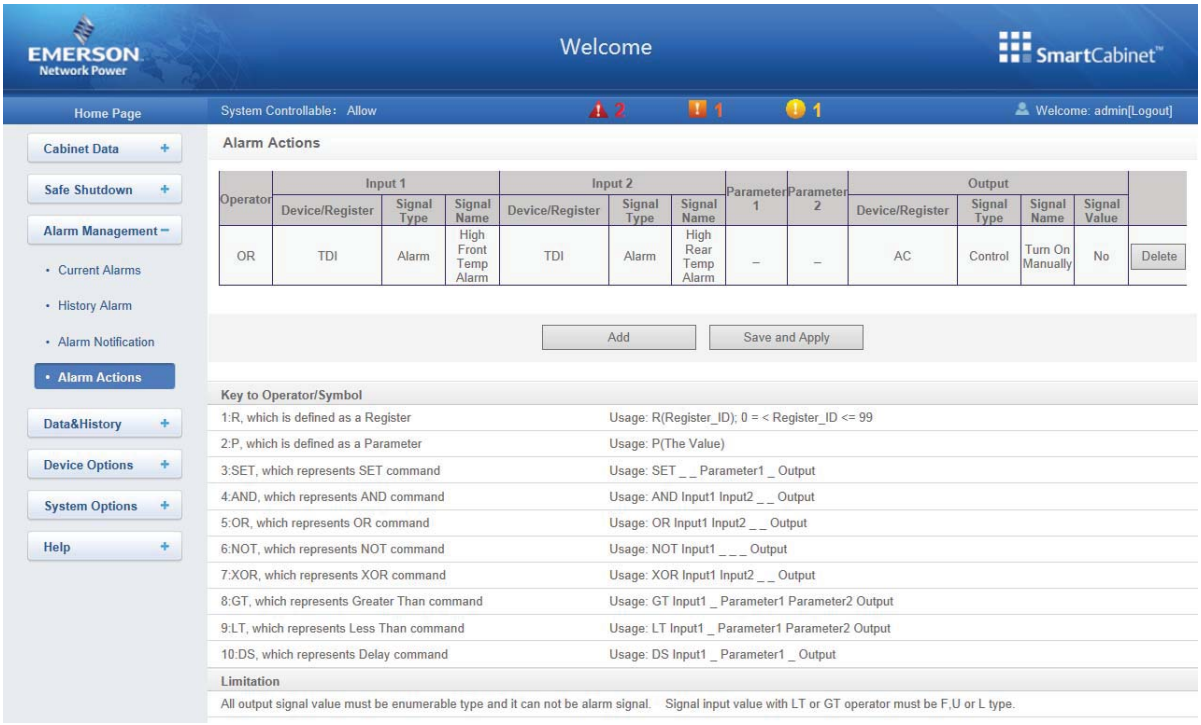


Figure 6-35 Alarm linkage configuration 4

The operator usages in the alarm linkage are listed in Table 6-1.

Table 6-1 Operator usages in the alarm linkage

Operator	Input 1	Input 2	Param1	Param2	Output	Expression
SET	/	/	P1	/	Sout/Rout	SET_ _P1_Output
AND	Sin1 /Rin1	Sin2 /Rin2	/	/	Sout/Rout	Sin1 [Rin1] AND Sin2 [Rin2] = Sout [Rout]
OR	Sin1 /Rin1	Sin2 /Rin2	/	/	Sout/Rout	Sin1 [Rin1] OR Sin2[Rin2] = Sout [Rout]
NOT	Sin1 /Rin1	/	/	/	Sout/Rout	Sin1 [Rin1] NOT = Sout [Rout]
XOR	Sin1 /Rin1	Sin2 /Rin2	/	/	Sout/Rout	Sin1 [Rin1] XOR Sin2[Rin2] = Sout [Rout]
GT	Sin1 /Rin1	/	P1	P2	Sout/Rout	When Sin1 [Rin1] > P1, Sout [Rout]=1; When Sin1 [Rin1] < P1 - P2, Sout [Rout]=0
LT	Sin1 /Rin1	/	P1	P2	Sout/Rout	When Sin1 [Rin1] < P1, Sout [Rout]=1; When Sin1 [Rin1] > P1 + P2, Sout [Rout]=0
DS	Sin1 /Rin1	/	P1	/	Sout/Rout	Sin1 [Rin1] DS P1 output to Sout [Rout]

Operator	Input 1	Input 2	Param1	Param2	Output	Expression
Note: 1. Sin1, Rin1, Sin2, Rin2, P1, P2, Sout, Rout respectively refer to Signal 1, Input1 Register, Signal 2, Input2 Register, Parameter 1, Parameter 2, Signal 3, Output Register; 2. The input signal of logic operator AND/OR/NOT/XOR/DS can only be alarm signal; 3. The input signal value of arithmetic operator GT/LT can only be float, int or long int; 4. All output signals can only be control signals, and the output signal value must be enumerated type						

The alarm linkage information has already been configured before delivery of SmartCabinet, as shown in Figure 6-40:

6.4.4 Data & History

The **Data & History** menu supplies query service of all types of historical data and logs for the user.

On the MSC-C homepage, click **Data & History** in the left part, three submenus appear, including: **Device Information**, **History Data** and **History Log**.

Device Information

Click the **Device Information** submenu under the **Data & History** menu, the page shown in Figure 5-41 pops up. The page includes two tabs: **Device Information List** and **Export SNMP MIB**.

1. Device Information List

As shown in Figure 6-36, the page lists the main information of all equipment. Click the **Download** button to download the query result.

Figure 6-36 Device information list

2. Export SNMP MIB

As shown in Figure 6-37, you can select **Export All Device MIB** or **Export MIB By Device**. After selection, click the **Download** button to export MIB information.

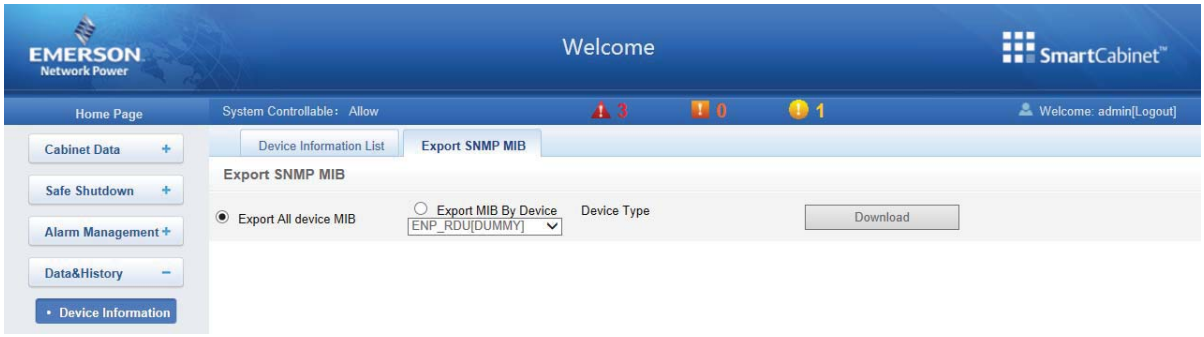


Figure 6-37 Export SNMP MIB

Note

If you do not get the SNMP service authorization, the **Export SNMP MIB** page will not appear. If you need to get the SNMP service license, please contact Emerson customer service center for purchase, and the contact number is 4008876510.

History Data

Click the **History Data** submenu under the **Data & History** menu, the page shown in Figure 6-38 pops up. The page has two tabs: **History Data** and **Historical Curve**.

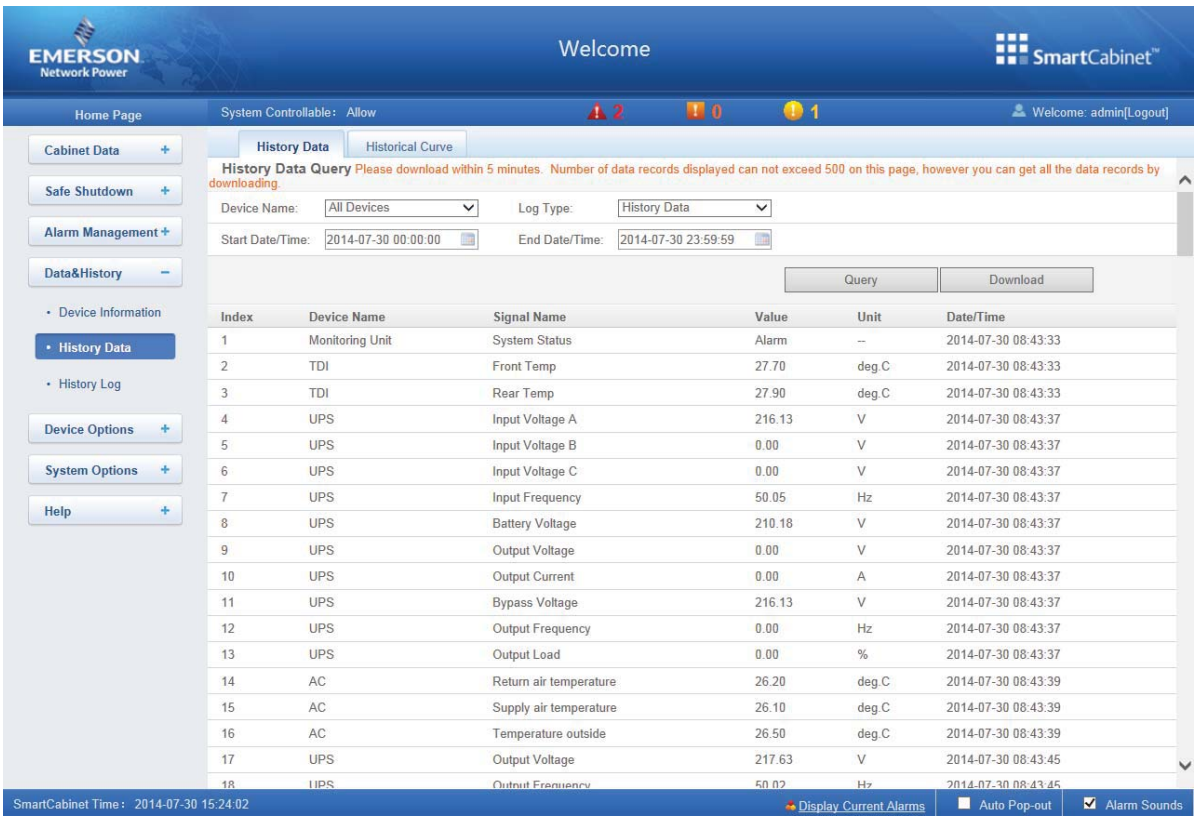

EMERSON Network Power
Welcome
SmartCabinet
Home Page
System Controllable: Allow
2
0
1
Welcome: admin[Logout]
Cabinet Data
Safe Shutdown
Alarm Management
Data&History
Device Information
History Data
History Log
Device Options
System Options
Help
History Data
Historical Curve
History Data Query Please download within 5 minutes. Number of data records displayed can not exceed 500 on this page, however you can get all the data records by downloading.
Device Name: All Devices
Log Type: History Data
Start Date/Time: 2014-07-30 00:00:00
End Date/Time: 2014-07-30 23:59:59
Query
Download
Index | Device Name | Signal Name | Value | Unit | Date/Time
1 | Monitoring Unit | System Status | Alarm | -- | 2014-07-30 08:43:33
2 | TDI | Front Temp | 27.70 | deg.C | 2014-07-30 08:43:33
3 | TDI | Rear Temp | 27.90 | deg.C | 2014-07-30 08:43:33
4 | UPS | Input Voltage A | 216.13 | V | 2014-07-30 08:43:37
5 | UPS | Input Voltage B | 0.00 | V | 2014-07-30 08:43:37
6 | UPS | Input Voltage C | 0.00 | V | 2014-07-30 08:43:37
7 | UPS | Input Frequency | 50.05 | Hz | 2014-07-30 08:43:37
8 | UPS | Battery Voltage | 210.18 | V | 2014-07-30 08:43:37
9 | UPS | Output Voltage | 0.00 | V | 2014-07-30 08:43:37
10 | UPS | Output Current | 0.00 | A | 2014-07-30 08:43:37
11 | UPS | Bypass Voltage | 216.13 | V | 2014-07-30 08:43:37
12 | UPS | Output Frequency | 0.00 | Hz | 2014-07-30 08:43:37
13 | UPS | Output Load | 0.00 | % | 2014-07-30 08:43:37
14 | AC | Return air temperature | 26.20 | deg.C | 2014-07-30 08:43:39
15 | AC | Supply air temperature | 26.10 | deg.C | 2014-07-30 08:43:39
16 | AC | Temperature outside | 26.50 | deg.C | 2014-07-30 08:43:39
17 | UPS | Output Voltage | 217.63 | V | 2014-07-30 08:43:45
SmartCabinet Time: 2014-07-30 15:24:02
Display Current Alarms
Auto Pop-out
Alarm Sounds

Figure 6-38 History data

1. History Data

As shown in Figure 6-38, choose a device (for instance, 'All Devices') and the Log Type (for instance, 'History Data'), and set the start time and the end time (for instance, from 2014-07-30 00:00:00 to 2014-07-30 23:59:59). Then click the **Query** button, all the history data during the time will be listed, click the **Download** button to download the query result.

2. Historical Curve

As shown in Figure 6-39, choose a device (for instance, 'TDI') and the Log Type (for instance, 'Front Temp'), and set the start time and the end time (for instance, from 2014-07-30 00:00:00 to 2014-07-30 23:59:59). Then click the **Show Curve** button, if history data are queried, a historical curve of the signal will be shown.

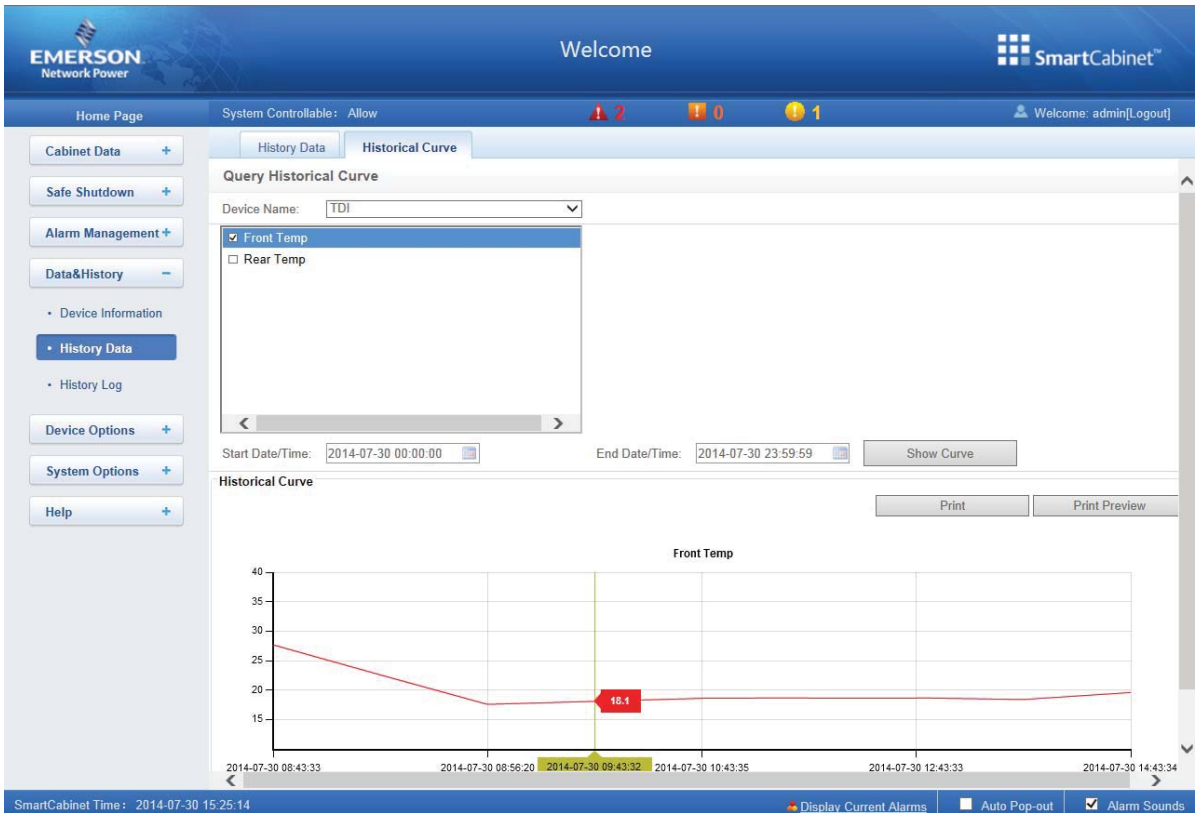


Figure 6-39 Historical curve

History Log

Click the **History Log** submenu under the **Data & History** menu, the page shown in Figure 6-40 pops up.

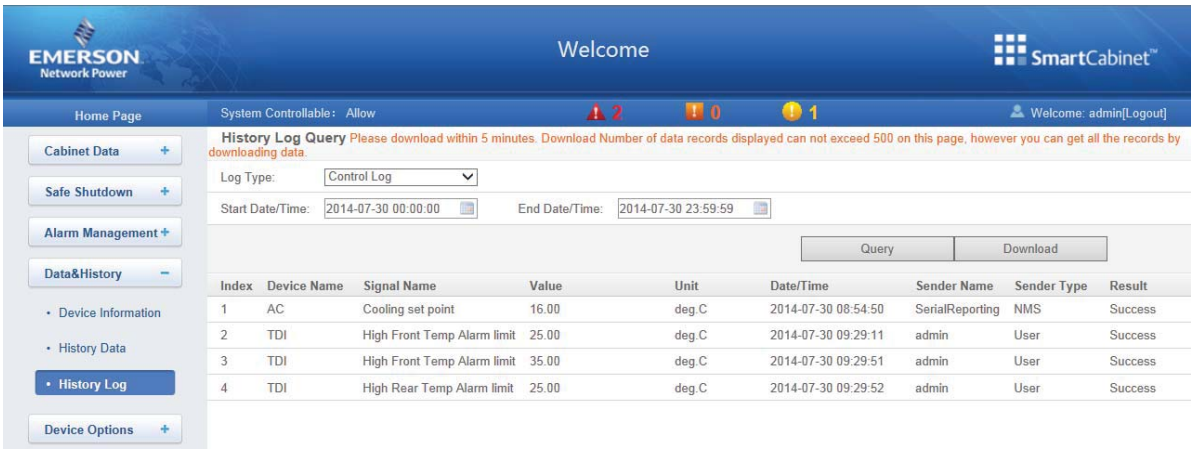

EMERSON Network Power
Welcome
SmartCabinet
Home Page
System Controllable: Allow
2
0
1
Welcome: admin[Logout]
Cabinet Data
Safe Shutdown
Alarm Management
Data&History
Device Information
History Data
History Log
Device Options
History Log Query Please download within 5 minutes. Download Number of data records displayed can not exceed 500 on this page, however you can get all the records by downloading data.
Log Type: Control Log
Start Date/Time: 2014-07-30 00:00:00
End Date/Time: 2014-07-30 23:59:59
Query
Download
Index Device Name Signal Name Value Unit Date/Time Sender Name Sender Type Result
1 AC Cooling set point 16.00 deg.C 2014-07-30 08:54:50 SerialReporting NMS Success
2 TDI High Front Temp Alarm limit 25.00 deg.C 2014-07-30 09:29:11 admin User Success
3 TDI High Front Temp Alarm limit 35.00 deg.C 2014-07-30 09:29:51 admin User Success
4 TDI High Rear Temp Alarm limit 25.00 deg.C 2014-07-30 09:29:52 admin User Success

Figure 6-40 History log

On the page shown in Figure 6-45, choose the log type (for instance, 'Control Log') and set the start time and the end time (for instance, from 2014-07-30 00:00:00 to 2014-07-30 23:59:59). Then click the **Query** button, all control logs during the time will be listed, click the **Download** button to download the query result.

Note

When the log type is selected as 'System Log' or 'Driver Log', after clicking the **Query** button, the query result will not be displayed on the page, instead, it will be directly downloaded as a zip file.

6.4.5 Device Options

On the MSC-C homepage, click **Device Options** in the left part, three submenus will appear, including **Device Management**, **Signal Setting** and **Batch Configuration**.

Device Management

1. Add/Modify/Delete Device

Click the **Device Management** submenu under the **Device Options** menu, the page shown in Figure 6-41 pops up.

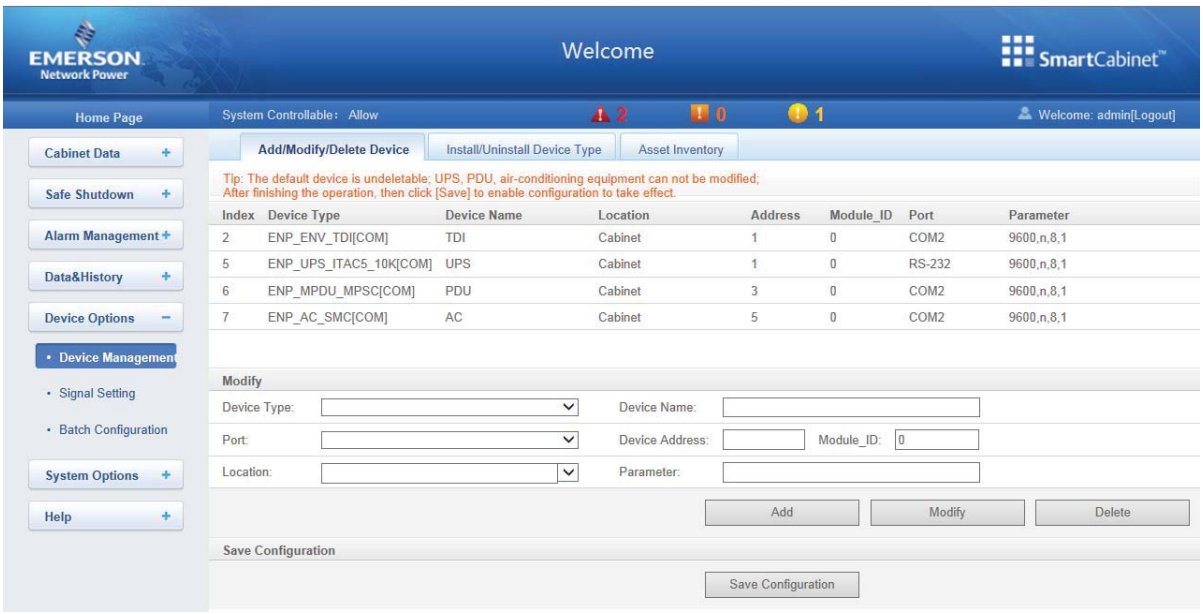


Figure 6-41 Add/modify/delete equipment

As shown in Figure 6-41, you can add/modify/delete a new device, the procedures are as follows:

●Adding a new device

1) Choose the device type in the **Device Type** textbox;

2) Type the device name in the **Device Name** textbox, or use the default device name;

3) After the device type is chosen, the drop-down box of **Port** will list the default port number(s) of the device type automatically; if the device type is not chosen, the port number cannot be chosen;

4) Type the device address, which must be numbers from 1 to xx, in the **Device Address** textbox. The device addresses under the same port number must be different; for some device types, you need not type the device address, at this point, the **Device Address** textbox turn gray and cannot be edited. When one kind of device has many models, you need to type the model ID, which must be numbers from 1 to xx. The model IDs under one kind of device must be different;

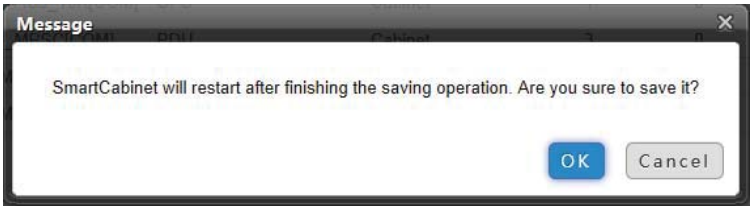
5) Choose or type the device location;

6) Type the communication parameter in the **Parameter** textbox. In the event that the device type is certain, the communication parameter prompt information will appear in the **Parameter** textbox, including the communication parameter format and default communication parameter of the equip type;

7) Click the **Add** button, the page shown in *Prompt information 1* in Figure 6-42 pops up, at the same time, a piece of new device information will be added in the device list;

8) Click the **Save Configuration** button, the page shown in *Prompt information 2* in Figure 6-42 pops up;

Prompt information 1



Prompt information 2

Figure 6-42 Prompt information

If clicking the **Cancel** button, the added equipment fails; if clicking **OK**, the dialog box of Security authentication pops up, as shown in Figure 6-16.

9) Type the login password of current user, and click **OK**. The reboot page pops up, as shown in Figure 6-43;

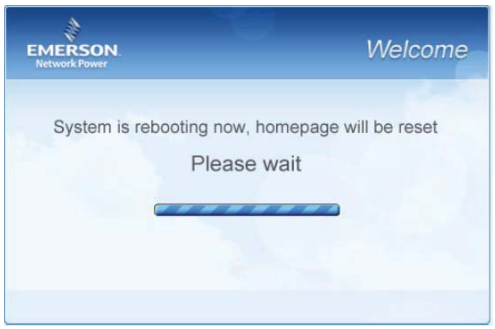


Figure 6-43 Reboot page

After the system reboots, adding a device becomes effective.

10) Log in the MSC-C webpage again and the added device will appear in the list on device management page.

Note

Up to eight intelligent devices (excluding MSC-C itself, ENV-TH, ENV-4DI) can be added in the system by default.

●Deleting a device

1) Choose the device which needs to be deleted in the device list;

2) Click the **Delete** button to delete the device;

3) Click the **Save Configuration** button to make the settings become effective, and the detailed procedures are the same as those of adding a new device.

Note

Before clicking the **Delete** button, if the device information has been modified, it cannot be deleted.

●Modifying a device

1) Choose the device which needs to be modified in the device list;

2) Modify the device information;

3) Click the **Modify** button to make the setting effective;

4) Click the **Save Configuration** button to make the settings become effective, and the detailed procedures are the same as those of adding a new device.

After adding, modifying or deleting procedures, if you leave the **Add/Modify/Delete Device** page without clicking the **Save Configuration** button to make the settings effective, the prompt information will pop up to remind you of saving the configuration, as shown in Figure 6-44.

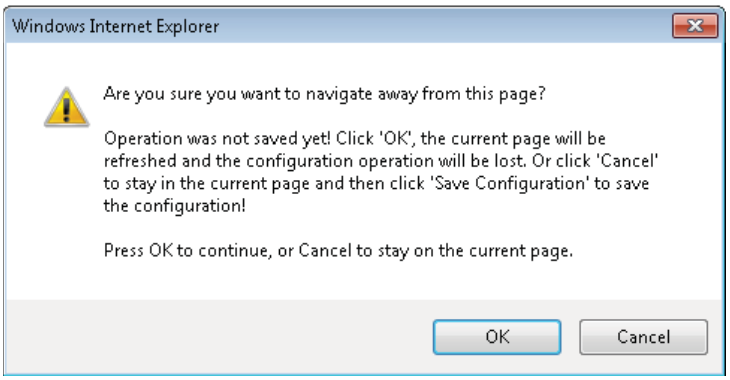

Windows Internet Explorer
Are you sure you want to navigate away from this page?
Operation was not saved yet! Click 'OK', the current page will be refreshed and the configuration operation will be lost. Or click 'Cancel' to stay in the current page and then click 'Save Configuration' to save the configuration!
Press OK to continue, or Cancel to stay on the current page.
OK
Cancel

Figure 6-44 Prompt information 3

Note

Clicking the **Save Configuration** button can save all the operations at one time.

2. Install/Uninstall Device Type

Click the **Device Management** submenu under the **Device Options** menu, and then click the **Install/Uninstall Device Type** tab, the page shown in Figure 6-45 pops up.

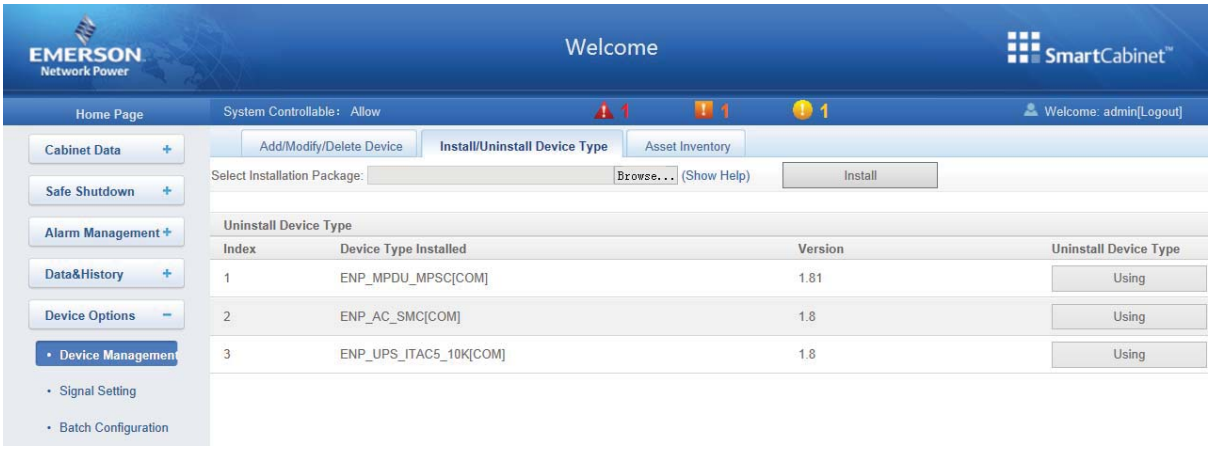


Figure 6-45 Install/Uninstall Device Type

Click the **Browse…** button to download configure package (file format of .iru) from local content, and click the **Install** button to install the new device type.

Note

The device type number supported by the system is related to the system remaining memory and the size of driver configuration package, but the number cannot exceed 64.

The page displays the installed device type information in the lower right part. Click the **Uninstall** button, the confirming dialog box pops up, as shown in Figure 6-46.

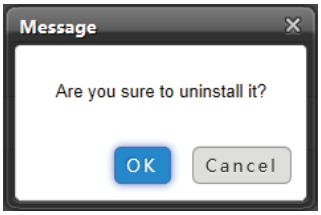


Figure 6-46 Confirming dialog box

Click **OK**, the dialog box of Security authentication pops up, as shown in Figure 6-16, type the login password of current user, and click **OK** to uninstall the corresponding equipment type.

Note

1. While installing device type, if the device type exists and the device driver has a higher version than the driver to be added, it cannot be installed repeatedly;

2. If the installation pack has no version information, or the version information does not match the software version, the device type cannot be installed.

2. If some device uses the device type, the **Uninstall** button becomes gray, displaying **Using**, and the device type cannot be uninstalled.

3. Asset Inventory

Click the **Device Management** submenu under the **Device Options** menu, and then click the **Asset Inventory** tab, the page shown in Figure 6-47 pops up.

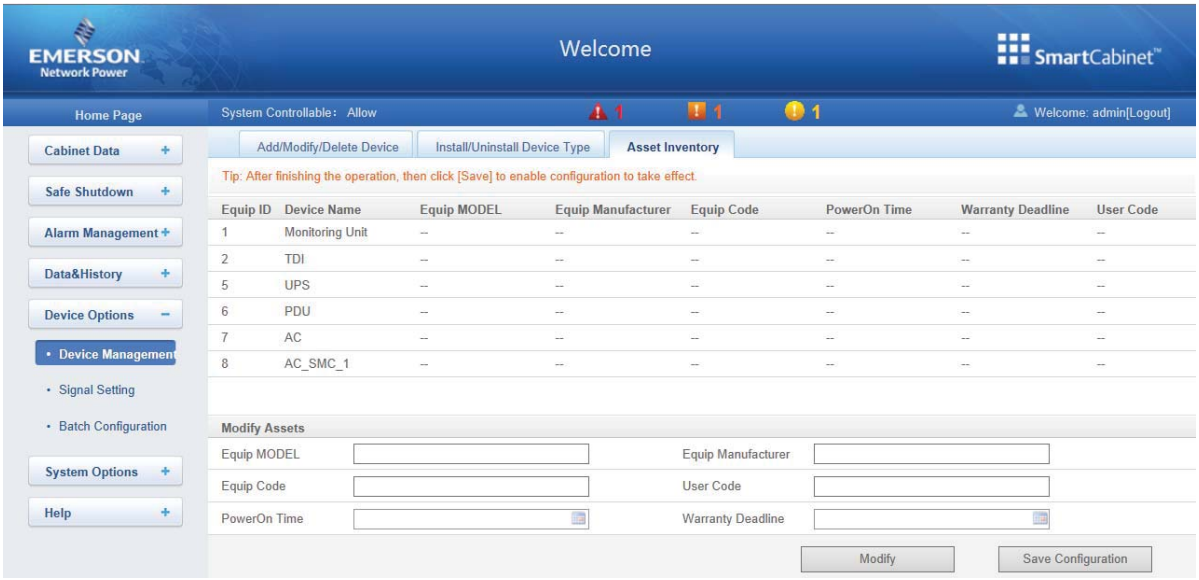


Figure 6-47 Asset Inventory

On the Asset Inventory page, you can set six items: **Equip Model**, **Equip Manufacturer**, **Equip Code**, **User Code**, **PowerOn Time** and **Warranty Deadline**.

Choose a device, and the corresponding asset information will be displayed in the textboxes at lower part of the page;

After self-defining and modifying, click the **Modify** button, the modified result will be displayed in the list at upper part of the page;

After all modifying is done, click the **Save Configuration** button to save the asset information.

Note

For the newly-added device, its default asset information is '--'.

Signal Setting

Click the **Signal Setting** submenu under the **Device Options** menu, the page shown in Figure 6-48 pops up.

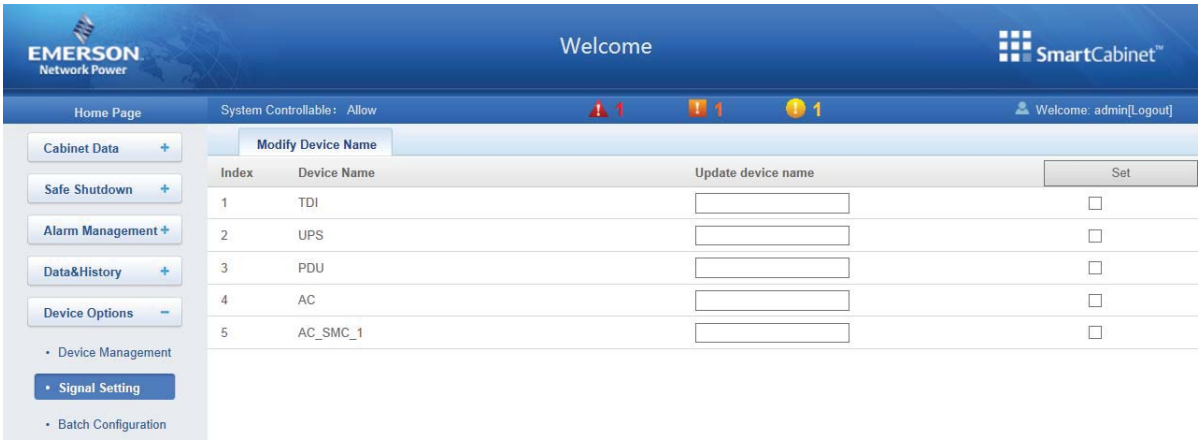


Figure 6-48 Modify device name

On the page shown in Figure 6-48, you can modify the device name. Type the new device name and click the **Set** button to make all setting effective.

Note

The characters of device name and signal name can be English letters, digits, space and underline. If other characters are typed, the prompt box shown in Figure 6-49 will pop up.

Figure 6-49 Prompt box of invalid characters

Batch Configuration

Click the **Batch Configuration** submenu under the **Device Options** menu, the page shown in Figure 6-50 pops up.

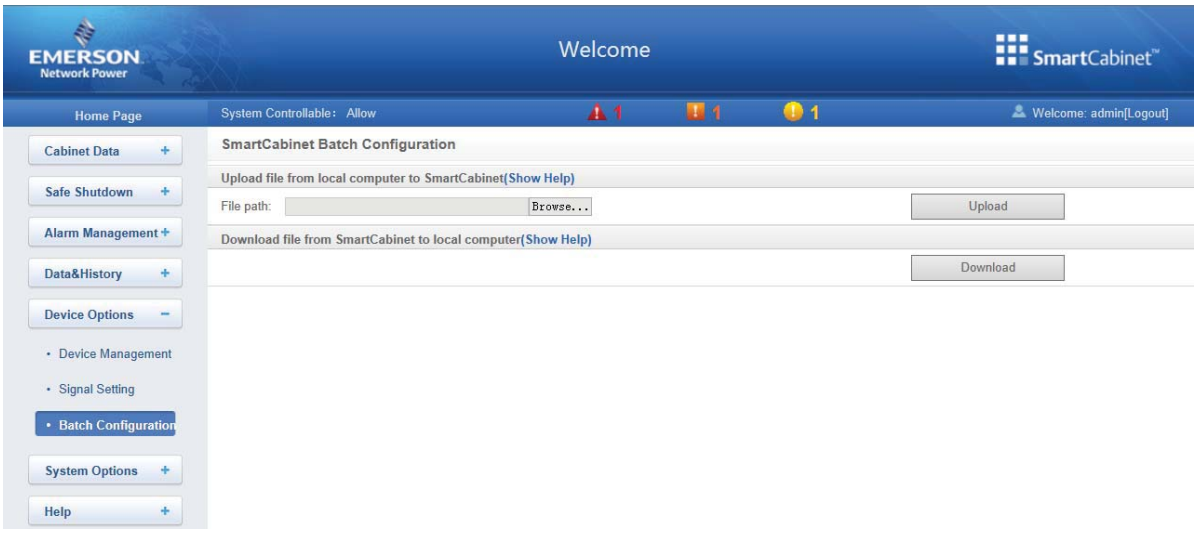


Figure 6-50 Batch configuration

On the page, you can perform **Upload** and **Download** operations to complete batch configuration.

Note

1. Only 'admin' has the authority of batch configuration. If you fail in performing batch configuration, please click **Show Help** to view the help information.
2. The batch configuration file is encrypted after downloaded to local.

6.4.6 System Options

On the MSC-C homepage, click the **System Options** menu in the left part, eight submenus appear, including: **Monitoring Unit**, **Network Setting**, **User Management**, **Date/Time Setting**, **Restore System**, **Site Setting**, **System Upgrade** and **System Title**.

Monitoring Unit

The **Monitoring Unit** submenu is used to set the signals of MSC-C system, including **Sampling**, **Setting** and **Alarm** signals, the page is shown in Figure 6-51.

Figure 6-51 Monitoring unit (Sampling)

As for the operation method of the three tabs of **Sampling**, **Setting** and **Alarm** on the Monitoring unit page, refer to *6.4.1 Cabinet Data*.

Note

On the **Setting** tab, if you set 'Blocked' for **Outgoing Alarm Blocked**, when an alarm occurs, it will be blocked, in this case:

1. For current alarms, the page only displays the alarm signals, but not send alarm notifications; after the alarm disappears, it will not be saved in history alarm;

2. The 'Blocked' setting for **Outgoing Alarm Blocked** will be automatically cleared in 24h.

Network Setting

1. IP Setting

Click the **Network Setting** submenu under the **System Options** menu, the page shown in Figure 6-52 pops up.

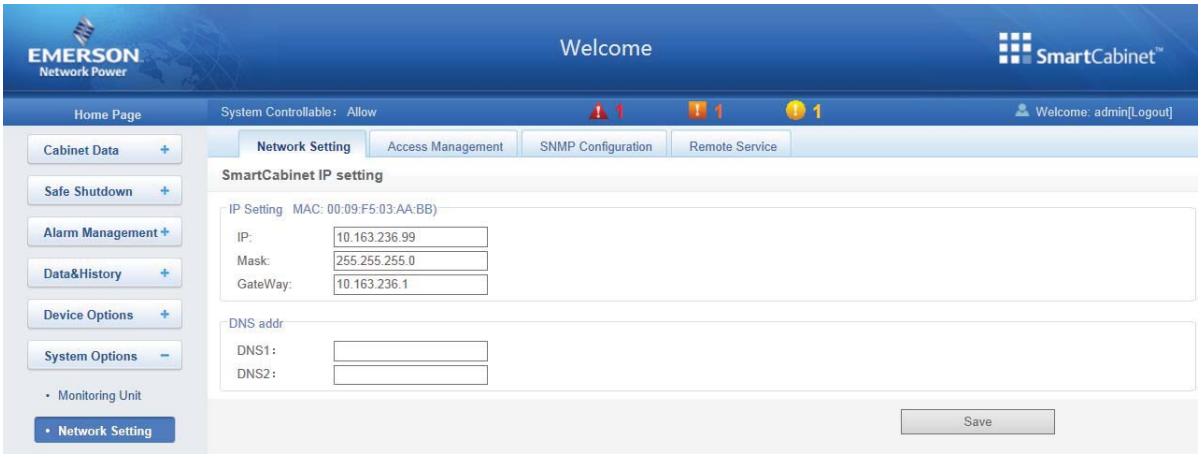


Figure 6-52 IP setting

On the page shown in Figure 6-52, you can configure the network parameters, such as IP addressing mode, **IP**, **Mask**, **Default Gateway**, **DNS1** (Preferred DNS server) and **DNS2** (Alternate DNS server). After modifying the network parameters, click the **Save** button to make the setting effective.

Note

After modifying the IP address, the system will jump to the new IP address by default. You must use the new IP address to re-login the MSC-C.

2. Access Management

Click the **Network Setting** submenu under the **System Options** menu, and then click the **Access Management** tab, the page shown in Figure 6-53 pops up.

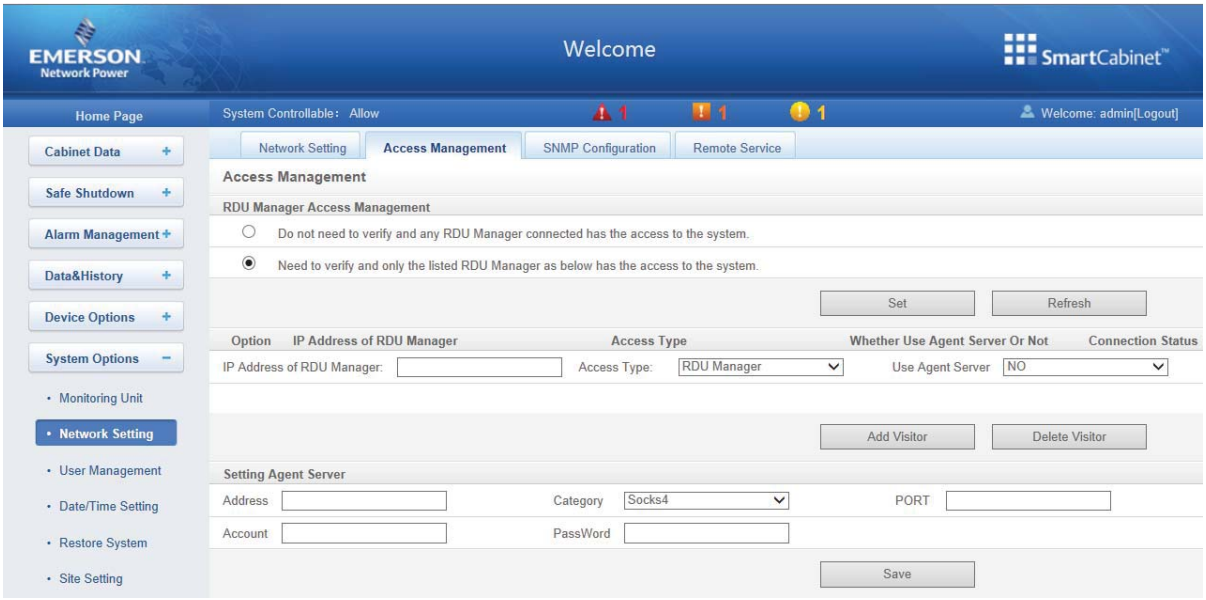


Figure 6-53 Access management

In the event of adding visitor, in the textbox of **IP Address of RDU Manager**, type the new IP address of the RDU manager, and click the **Add Visitor** button to finish the configuration.

Note

1. Up to three RDU manager IP addresses can be added in the system.
2. In the event of adding visitor, if you select to use an agent, you also need to configure the agent server.

3. SNMP Configuration

Click the **Network Setting** submenu under the **System Options** menu, and then click the **SNMP Configuration** tab, you can configure SNMP agent. The MSC-C system supports V2 and V3 versions of SNMP agent.

As shown in Figure 6-54, the specific setting method of SNMP V2 is as follows:

1) Set **NMS IP** (host IP address of SNMP agent data receiving end);

2) Set **Trap Level**: 'Enable' or 'disable';

3) Keep defaults for other items.

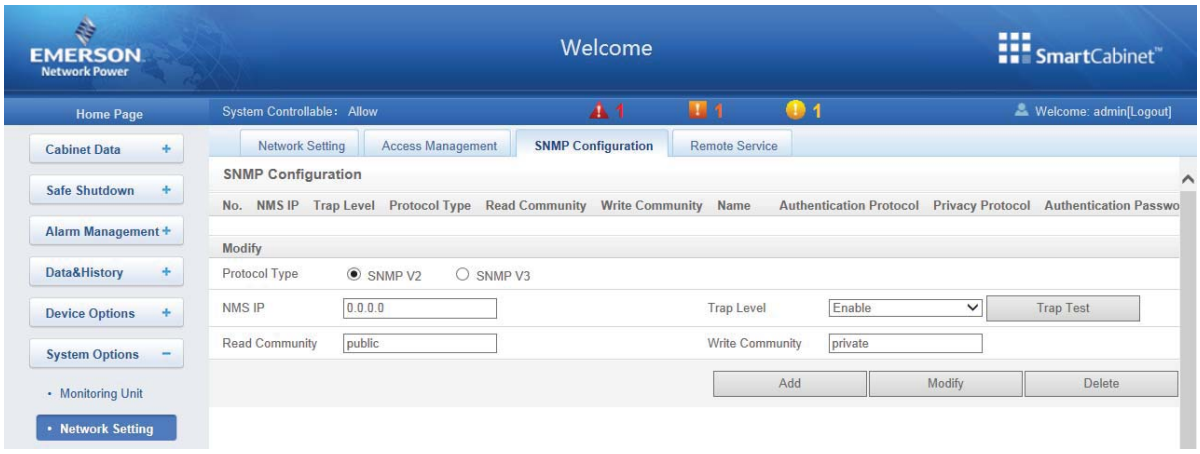


Figure 6-54 SNMP V2 setting

As shown in Figure 6-55, the specific setting method of SNMP V3 is as follows:

1) Set **NMS IP** (host IP address of SNMP agent data receiving end);

2) Set the **Trap Level**: 'Enable' or 'disable';

3) Set the **Name**;

4) Set the **User Type**: 'Authenticated & Encrypted', 'Authenticated & Not Encrypted', 'Not Authenticated & Not Encrypted';

5) Select **Authentication Protocol**: 'MD5', 'SHA';

6) Select **Privacy Protocol**: 'DES';

7) Self-define **Authentication Password** and **Privacy Password**.

Note

1. On the base of SNMP V2, SNMP V3 adds user authentication and privacy strategies.

2. If you select 'Not Authenticated & Not Encrypted' for **User Type**, the drop-down boxes of **Authentication Protocol** and **Privacy Protocol** will become gray, so you cannot set them;

3. Currently, only 'DES' is supported for **Privacy Protocol**.

4. You need to self-define **Authentication Password** and **Privacy Password**, which contain at least 8 characters, and be the same as the password set by the host of SNMP agent data receiving end, or it cannot be decrypted and received.

After parameter setting, click the **Add** button to add NMS;

If you need to modify NMS setting, select the NMS which needs to be modified, modify the setting and then click the **Modify** button to save the setting;

If you need to delete NMS, select the NMS which needs to be deleted, and then click the **Delete** button to delete the NMS.

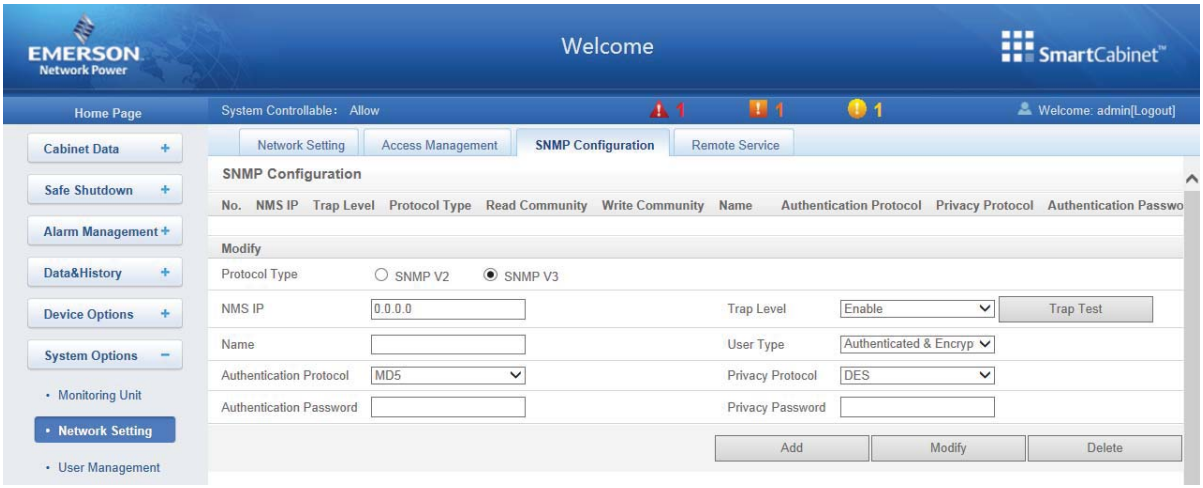


Figure 6-55 SNMP V3 setting

4. Remote Service

Click the **Network Setting** submenu under the **System Options** menu, and then click the **Remote Service** tab, the page shown in Figure 6-56 pops up.

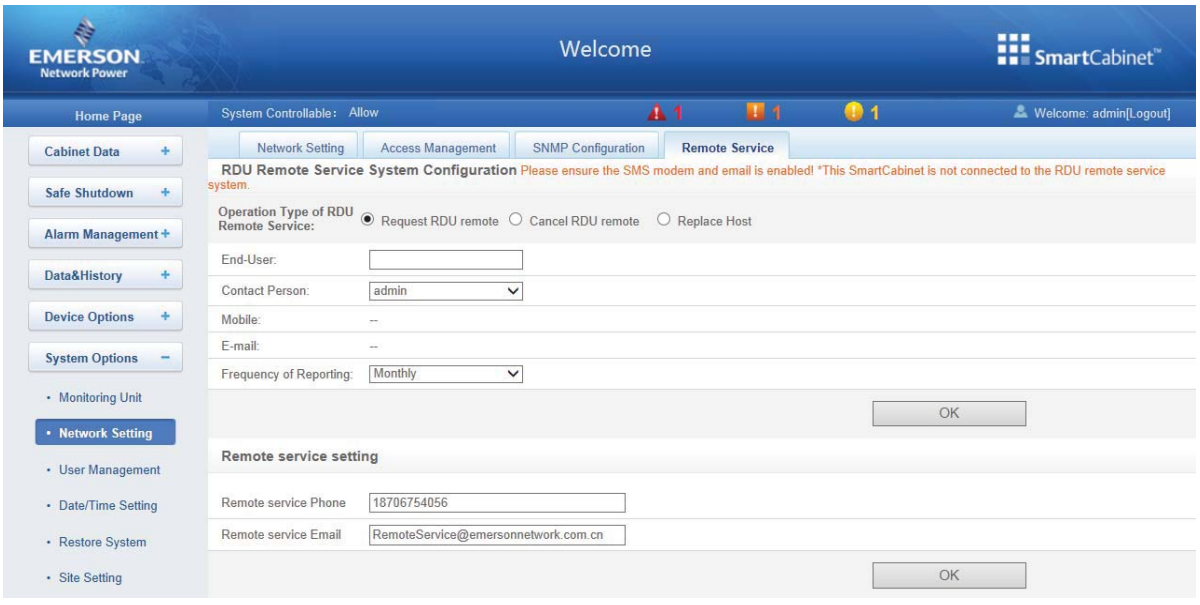


Figure 6-56 Remote service setting

The remote service setting includes three parts: **Request RDU remote**, **Cancel RDU remote** and **Replace Host**. Meanwhile, you can set the communication parameters of remote service system.

●Request RDU remote: used to establish remote service relationship

1) Type the self-defined customer name in the **End-User** textbox;

2) Choose the contactor for remote service in the **Contact Person** textbox, when the contactor is chosen, the corresponding mobile and email will be displayed;

Note

The contactor for remote service must be set through **System Options** -> **User Management** in advance, and you must provide the mobile or email, or the service request cannot be conducted. Refer to *User Management* in this section for detailed setting method.

3) Choose **Frequency of Reporting**: 'Monthly', 'Seasonal';

4) Click **OK** to send the remote service request.

●Cancel RDU remote: used to cancel the established remote service

Choose **Cancel RDU remote** and click **OK** to send a command to cancel the current remote service.

Note

Canceling the remote service is effective only under the precondition that the remote service has been established, otherwise, a prompt of failure will pop up after you click **OK**.

●Replace Host: used to replace the local host during remote service

When the host that has established remote service need to quit, but you want to remain the established remote service relationship, you need to replace the local host to participate in the remote service. The detailed setting method is the save as **Request RDU remote**, besides, type the hardware serial number of the replaced host.

User Management

Click the **User Management** submenu under the **System Options** menu, the page shown in Figure 6-57 pops up.

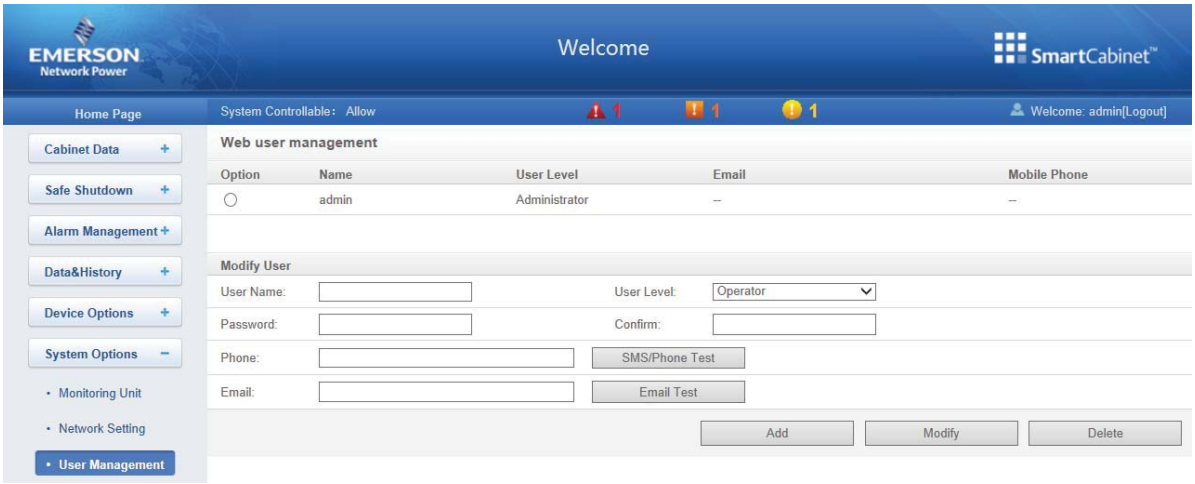


Figure 6-57 User management

On the page shown in Figure 6-57, you can add user, modify user and delete user.

●Add user

1. Type username in the **User Name** textbox;

2. Choose the user authority;

3. Configure the user password, which cannot be vacant and should contain at least six letters or digits.

4. Re-type the password in the **Confirm** textbox;

5. (Optional) Type the user telephone number, which can use the following digits and characters: 0123456789, +;

6. (Optional) Type the email address;

7. Click the **Add** button, the dialog box of Security authentication pops up, as shown in Figure 6-16. Type the login password of current user, and click **OK** to add a new user.

Note

The characters of username can only be English letters, digits, -, and _. In addition, the initial characters must be letters or digits.

●Delete user

1. Choose the user which needs to be deleted in the username list;

2. Click the **Delete** button to pop up the confirming dialog box, as shown in Figure 6-58.

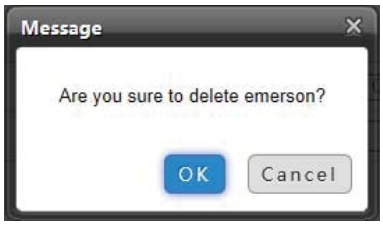


Figure 6-58 Confirming dialog box

3. Click **OK**, the dialog box of Security authentication pops up, as shown in Figure 6-16. Type the login password of current user, and click **OK** to delete the chosen user.

Note

The user of 'admin' cannot be deleted.

●Modify user

1. Choose the user which needs to be modified in the username list;

2. Modify the user information;

3. Click the **Modify** button, the dialog box of Security authentication pops up, as shown in Figure 6-16. Type the login password of current user, and click **OK** to make the modified user information effective.

Users who access MSC-C can be divided into four user groups, and they have different security level and user authority, see Table 6-2 for detailed information.

Table 6-2 User security level

Security level	User group	User authority
Level A	Browser	All users can browse equipment information
Level B	Operator	The operators can send control command to intelligent equipment
Level C	Engineer	The engineers can get the following access: Send control command to intelligent equipment; Browsing, controlling and modifying parameters; Download files; Modifying user information of their own
Level D	Administrator	The administrator can get full access: Send control command to intelligent equipment; Browsing, controlling and modifying parameters; Upload and download files; Modifying, adding and deleting user information; AC teamwork parameter setting; System upgrade

On the page shown in Figure 6-57, choose the current user, you can perform **SMS/Phone Test** and **Email Test**.

Before using the test function, users need to configure the SMS/Email server of current user, refer to *Alarm Notification* in *6.4.3 Alarm Management* for details.

●SMS/Phone Test

Type the phone number in the **Phone** field, and click the **SMS/Phone Test** button to test that the telephone number of current user can be gotten through. If users receive the test SMS and telephone, the test is successful; if not, the test fails, please check that the telephone number is correct and the SMS Modem is properly connected.

●Email Alarm Notify Test

Type the email address in the **Email** field, and click the **Email Test** button to test that the email address of current user is correct. If users receive the test email, the test is successful; if not, the test fails, please check that the information above is correctly typed.

Note

When adding, modifying user, you must type the phone number or the email address, or the setting cannot be completed.

Date/Time Setting

Clicking the **Date/Time Setting** submenu under the **System Options** menu can synchronize the time. On the page shown in Figure 6-59, MSC-C can get time from the time servers automatically. Type IP address in the **Primary server** textbox and **Secondary server** textbox in sequence, type a figure in **Interval to calibrate system time** textbox, select the **Time zone** and **Calibrating Protocol**, and then click the **Set** button to make the setting effective.

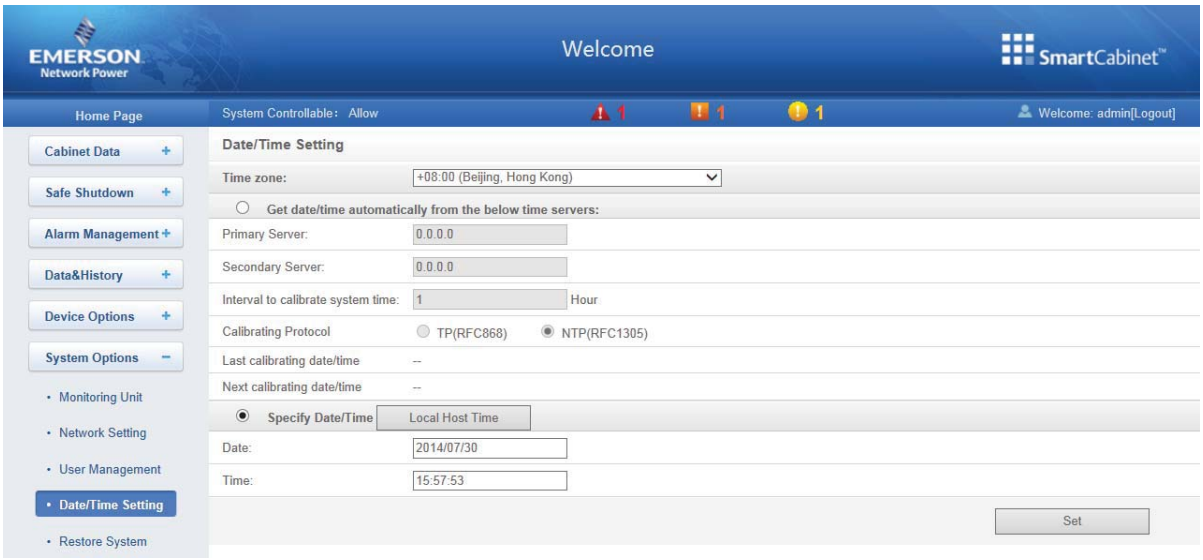


Figure 6-59 Date/time setting

The MSC-C can also get the local time. Choose **Specify Date/Time**, click the **Local Host Time** button to get the local time, and then click the **Set** button to make the new time effective.

Note

Time calibration adopts **Specify Date/Time** by default.

Restore System

Click the **Restore System** submenu under the **System Options** menu, the page shown in Figure 6-60 pops up.

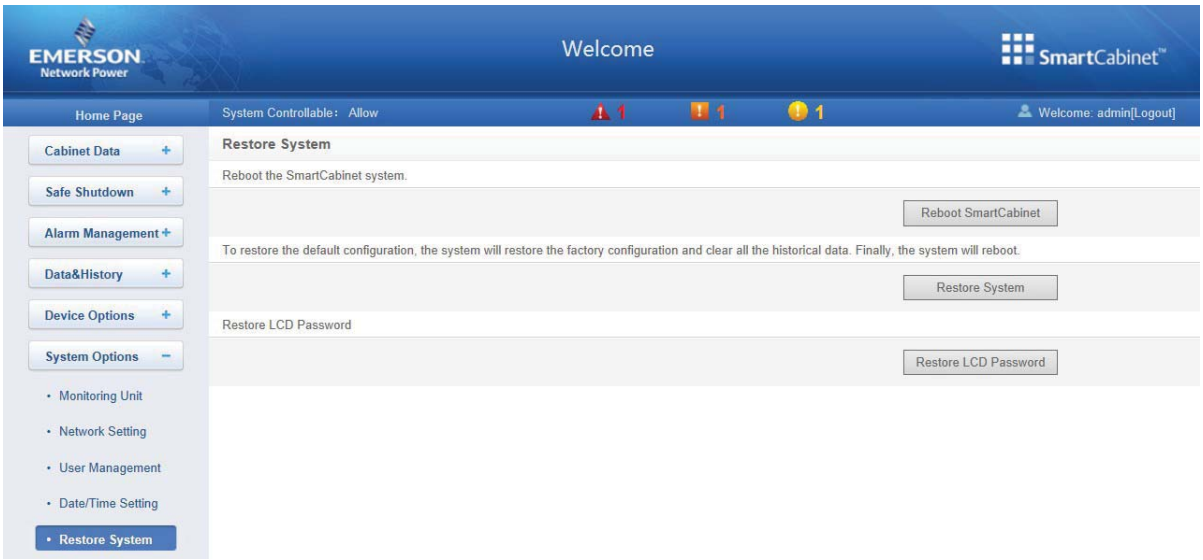


Figure 6-60 Restore System

Click the **Reboot SmartCabinet** button to reboot the system.

Click the **Restore System** button to restore all the default settings.

Click the **Restore LCD Password** button, a **Restore Password** button will appear on the LCD display panel of the SmartCabinet.

Note

If you use the restore function, the MSC-C may lose the original configuration solution. After the restore operation, make sure to wait one minute for the MSC-C conducting complete initializing work before re-accessing it through Web.

Site Setting

Click the **Site Setting** submenu under the **System Options** menu, the page shown in Figure 6-61 pops up.

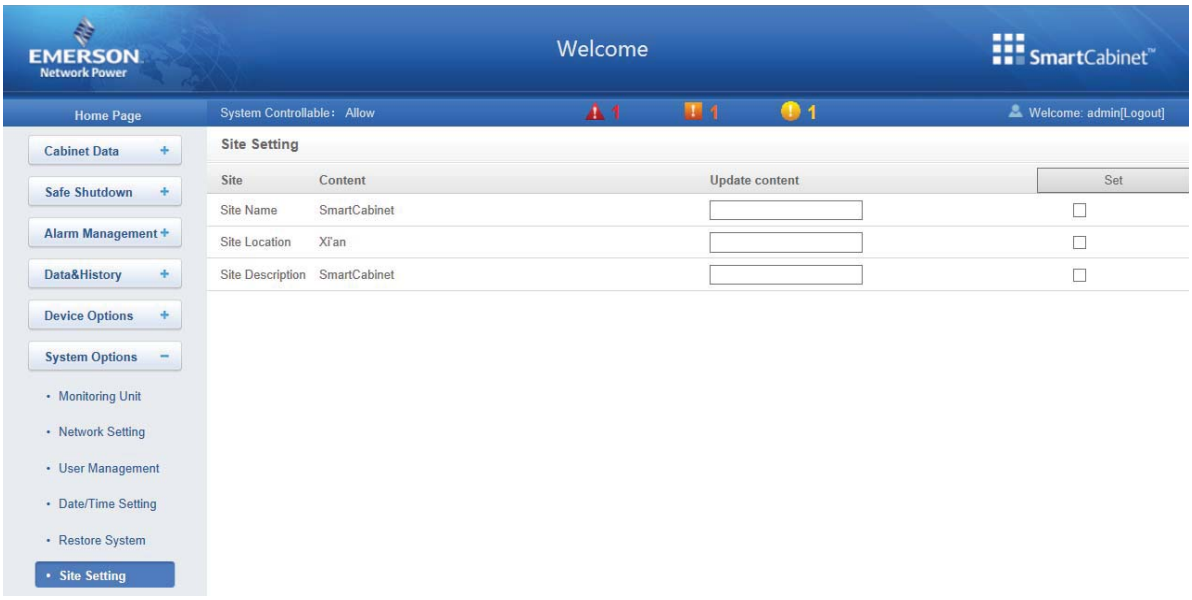


Figure 6-61 Site information setting

On the page shown in Figure 6-61, you can modify the site information of MSC-C, including **Site Name**, **Site Location** and **Site Description**.

System Upgrade

Click the **System Upgrade** submenu under the **System Options** menu, the page shown in Figure 6-62 pops up.

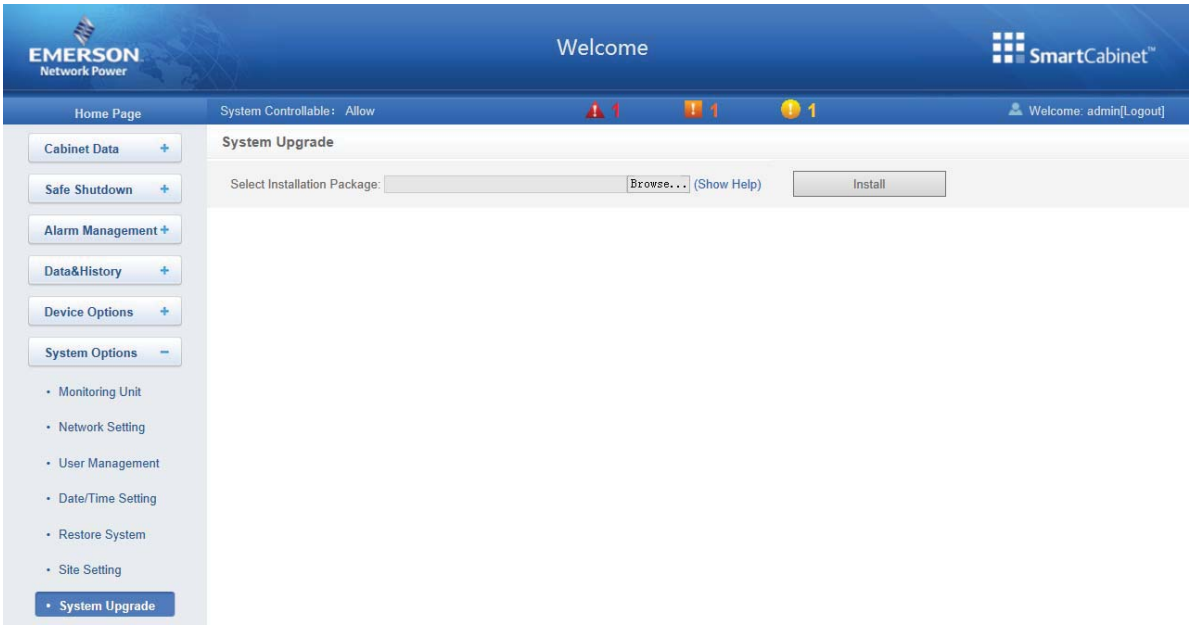


Figure 6-62 System upgrade

On the page shown in Figure 6-62, click the **Browse…** button to download configure pack (.rdu file format) from the local catalogue, and then click the **Install** button to upgrade the system.

Note

The MSC-C supports incremental upgrading function.

System Title

Click the **System Title** submenu under the **System Options** menu, the page shown in Figure 6-63 pops up.

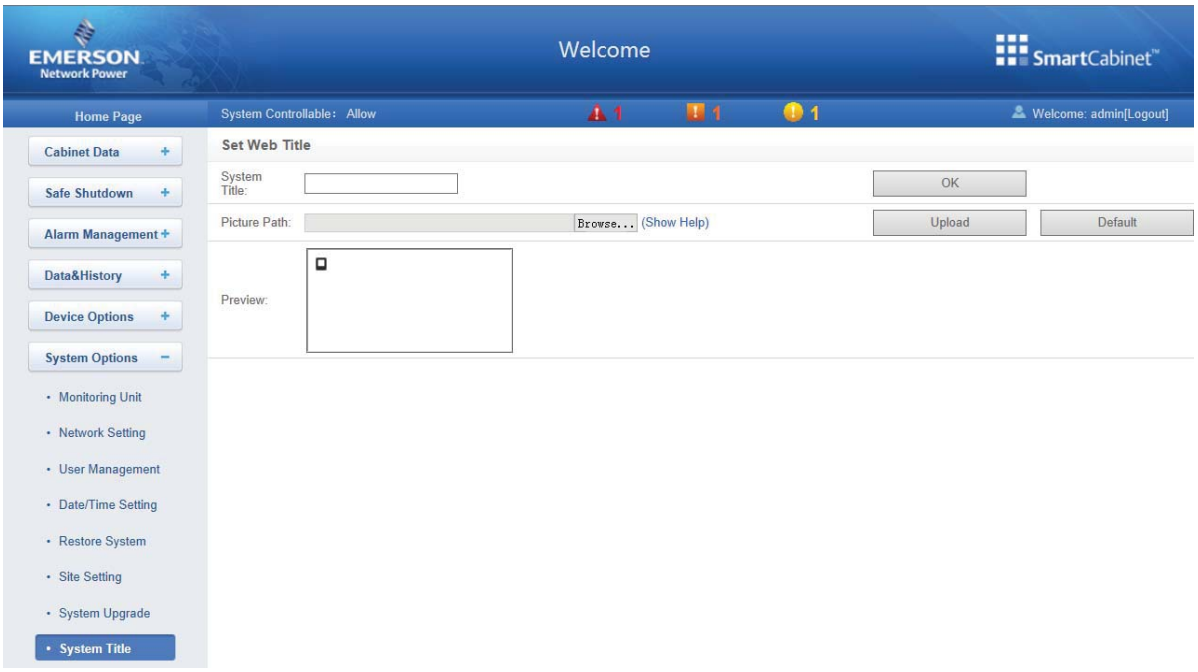


Figure 6-63 Title setting

As shown in Figure 6-63, you can change the system title **SmartCabinet** at the top of the page. Type the customized title in the **System Title** textbox and click **OK** to make it effective. You can also replace the Logo picture in the upper right part by uploading system Logo picture. Click the **Browse…** button, choose the needed Logo picture and click the **Upload** button to upload the file to MSC-C. Only [.gif], [.bmp], [.jpg] and [.png] format pictures are allowed, and the picture size should be less than 500K. Clicking the **Default** button can restore the default Logo picture.

6.4.7 Help

On the MSC-C homepage, click the **Help** menu in the left part, one submenu appears: **About SmartCabinet**.

About SmartCabinet

The **About SmartCabinet** page displays **Software Version**, **Serial Number** and **Identify Code** of SmartCabinet, and supplies download links for SmartCabinet User Manual and Tools, as shown in Figure 6-64.

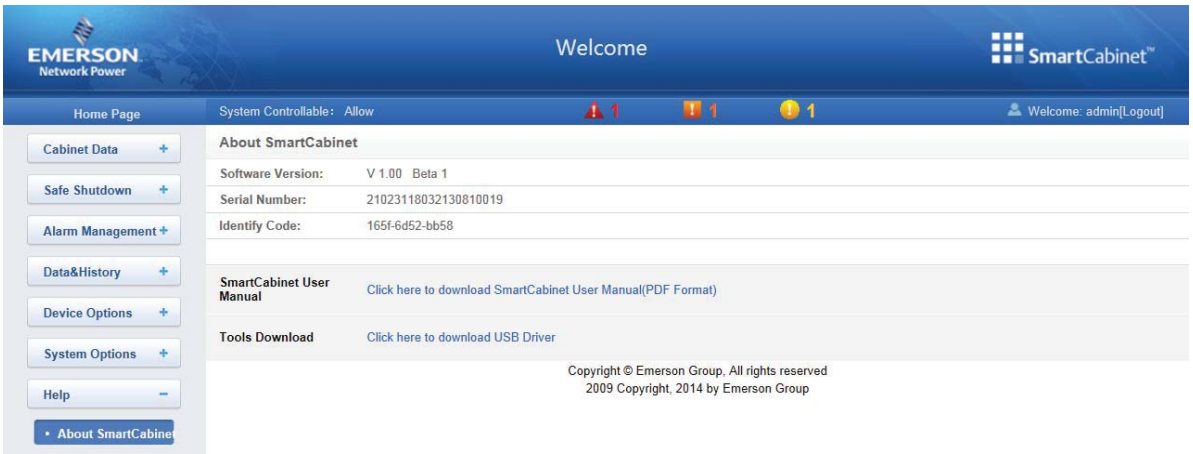


Figure 6-64 About SmartCabinet

Chapter 7 Maintenance

This chapter expounds the maintenance of SmartCabinet, including safety instructions, maintenance of the main components, disassembly and troubleshooting.

7.1 Safety Instructions

Warning

1. Switch off the power input during the equipment maintenance. Switch off the equipment power unless the testing device needs power.
2. Only authorized professional technicians are allowed to maintain the system.

1. All maintenance and operation must follow the local laws, especially the regulations about the electric power, refrigeration and production.
2. Comply with the manufacturer instructions during maintenance. Failure to observe this could result in invalidation of warranty.
3. Ignoring the safety instructions will endanger personnel safety and environment.
4. Unsuitable components will lead to performance decrease or equipment shutdown, it is commended to use the components made by Emerson.

7.2 Maintenance Of The Main Components

Note

Regular maintenance & inspection are necessary to ensure proper operation of the equipment.

7.2.1 MSC-C Maintenance

Restoring default setting

Restoring default setting can be finished through two modes: software or hardware.

For software restoring, refer to *Restore System* in *6.4.6 System Options*.

Hardware restoring includes restoring MSC-C admin password (default username: admin, password: emerson) and MSC-C IP address (default IP address: 192.168.0.252). You can short pin2 and pin3 of jumper J18 on the MSC-C card to complete hardware restoring. The jumper position is shown in Figure 7-1.

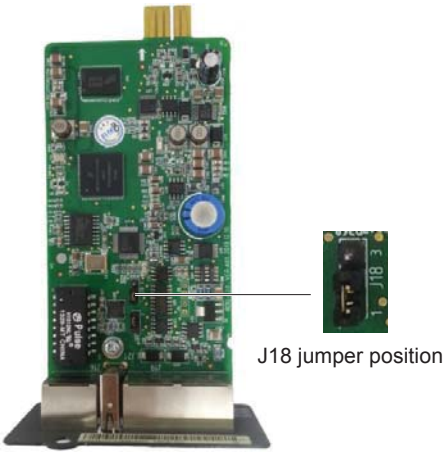


Figure 7-1 Jumper position for MSC-C hardware restoring

FAQ

Q1: After MSC-C is powered on, why the power indicator is not on?

A: Please check that the power cable is connected correctly.

Q2: How to deal with that the communication of COM port is abnormal?

A: Check that the COM ports on the MSC-C and the expansion card are RS-232/RS-485 adaptive ports; please ensure that the communication parameters are correctly configured.

Q3: How to deal with that there is no access to MSC-C login page when the MSC-C communication is normal?

A: There are three measures to solve the problem:

Step 1: Ensure that the IP address is correct;

1. Please ensure that the network cable is connected to the correct port.

2. The default IP address of MSC-C: 192.168.0.252.

Step 2: Ensure the connectivity of IP address.

To ensure the connectivity of IP address, you can use PING/ping command, and the method is as follows:

1) Click the icon at the lower left corner, and type 'cmd' in the textbox, as shown in Figure 7-2.

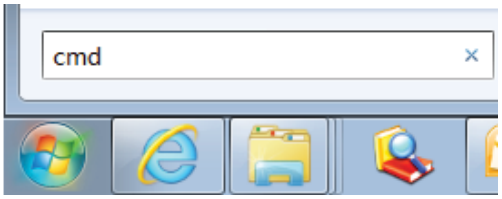


Figure 7-2 Typing 'cmd'

2) Press the Enter key, the page shown in Figure 7-3 pops up. Type 'ping' and IP address in the command line (for instance, 'ping 10.163.162.135') and check whether the communication is successful.

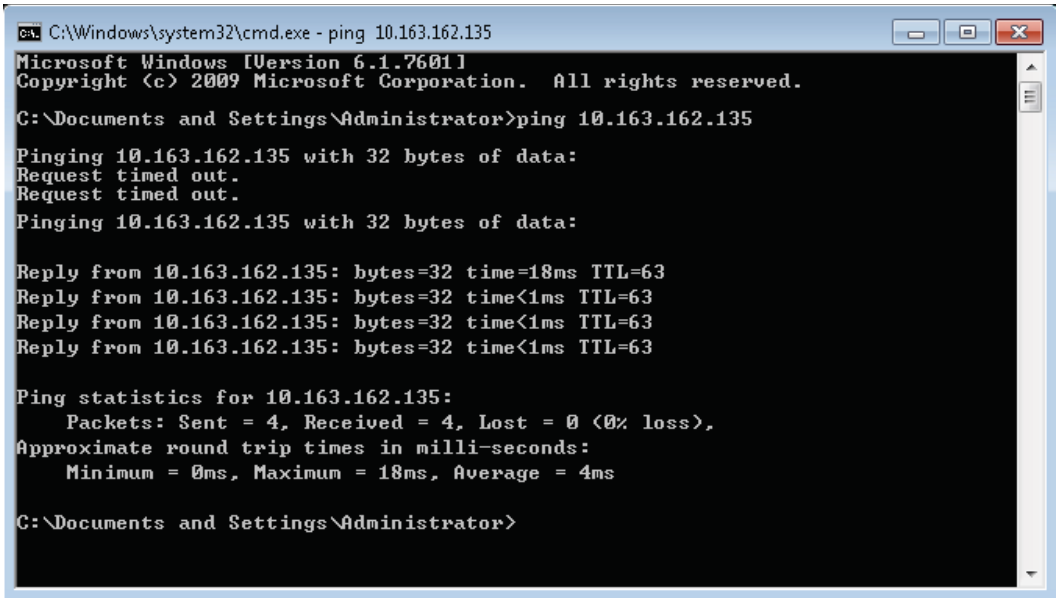

C:\Windows\system32\cmd.exe - ping 10.163.162.135
Microsoft Windows [Version 6.1.7601]
Copyright (c) 2009 Microsoft Corporation. All rights reserved.
C:\Documents and Settings\Administrator>ping 10.163.162.135
Pinging 10.163.162.135 with 32 bytes of data:
Request timed out.
Request timed out.
Pinging 10.163.162.135 with 32 bytes of data:
Reply from 10.163.162.135: bytes=32 time=18ms TTL=63
Reply from 10.163.162.135: bytes=32 time<1ms TTL=63
Reply from 10.163.162.135: bytes=32 time<1ms TTL=63
Reply from 10.163.162.135: bytes=32 time<1ms TTL=63
Ping statistics for 10.163.162.135:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 18ms, Average = 4ms
C:\Documents and Settings\Administrator>

Figure 7-3 Communication test

Step 3: If the above-mentioned steps cannot handle the problem, please use the jumper cap on the card to restore default IP. Refer to Table 3-7 for the use of jumper cap.

Step 4: Refer to *6.1 Login Preparation* to complete relevant operations.

Q4: You have chosen the ocean blue theme, but the page still adopts crystal blue theme while you are viewing the webpage of the MSC-C, how to deal with it?

A: Click the **[User] Logout** button to return the login page, click the icon to choose the ocean blue theme, and log in the system again.

Q5: After an alarm is generated, you do not receive any email or SMS notification; or when the alarm does not finish, the email or SMS notification is less than three times, how to deal with it?

A: Please perform troubleshooting according to the following procedures:

1) Please check that the SMS/Email server configuration is correct, refer to *Alarm Notification* in *6.4.3 Alarm Management*.

2) If you do not receive the SMS notification, please check that the phone is out of service because of overdue payment;

3) If you do not receive the email notification, please click the menu Data & History -> History Log to query the system log and check whether there is a record of failure in sending email. If so, it indicates that the network is busy or the email server communication is busy.

Q5: How to form a network of several SmartCabinet and perform centralized monitoring?

A: The SmartCabinet supports connection to RDU-M centralized monitoring platform of Emerson. See Figure 7-4 for the networking mode of several SmartCabinet.

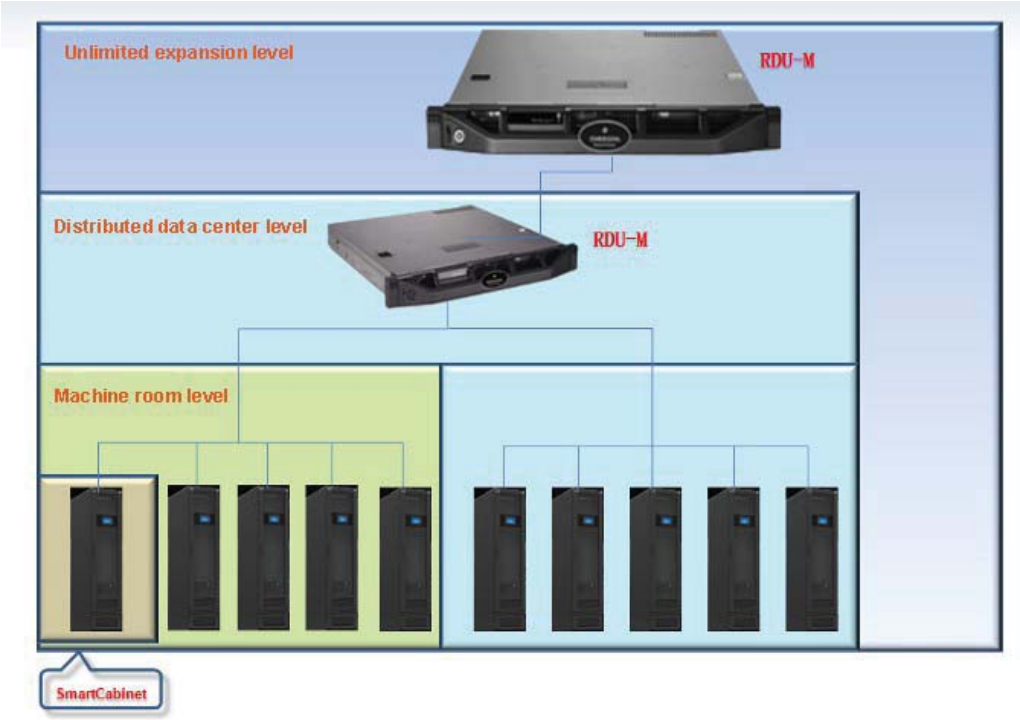


Figure 7-4 SmartCabinet networking topology diagram

7.2.2 AC System Maintenance

The AC system maintenance includes electric inspection, indoor unit maintenance, outdoor unit maintenance and maintenance inspection checklist.

Note

Switch off the circuit breaker and cut off the unit power before maintenance unless the power is necessary for the commissioning item.

1. Electric inspection

Visually inspect the control board, temperature sensor on a semi-annual basis for any loose electric connection and circuit corrosion.

Inspect the boards one by one according to the procedures below:

1) Do unit electric insulation test to find failed contacts and deal with them.

2) Tighten all electric contacts.

3) Clean the electric and control components with a brush or compressed dry air.

Note

All circuit boards are not hot-pluggable. Big instant current will be produced when the board is plugged or unplugged with powering on and it may lead to unrepairable damage to the circuit. The control board can only be maintained after the micro-processing controller is powered off.

2. Indoor unit maintenance

1) Fan

Since the fan kit operates 24 hours every day continuously, any unusual airflow obstruction must be cleared in time to avoid the damage to the cooling system and other system components caused by reduced air volume.

2) Drain pipe

Inspect water pan periodically for normal operation of the drain pipe. Ensure that no foreign matter or leakage exits in the drain pipe.

3. Outdoor unit maintenance

1) Refrigeration system

The components of the refrigerant system should be inspected monthly for finding abnormal operation phenomenon in time. Refrigerant pipes must be properly fixed and not allowed to vibrate against wall, floor or the unit frame. Inspect all refrigerant pipes every six months for signs of wear.

2) Air-cooled condenser

When the airflow through the outdoor unit is restricted, use compressed air or fin cleaner (alkalescence) to clean the condenser off the dust and debris that inhibit airflow. The compressed air should be blown at the reversed airflow direction. In winter, do not let snow to accumulate around the side or underneath the condenser. Check for bent or damaged fins and simply repair them if necessary. Check all refrigerant pipes and capillaries for vibration and support them if necessary. Carefully inspect all refrigerant pipes for signs of oil leakage, thus determining the leakage position.

3) Compressor

The compressor fault is generally classified into two types:

- Motor fault (such as winding burnout, insulation failure, short-circuit between coils and so on).
- Mechanical fault (such as compressing failure, relief valve fault, therm-o-disc fault and so on).

If the operation pressure is not established, it indicates that the compressor has failed. It can be confirmed if the suction pressure and discharge pressure are balanced and the motor does not rotate reversely.

The controller has powerful alarm and protection functions to ensure safe operation of the compressor. The maintenance personnel should record the high pressure and low pressure and find out the cause of an alarm protection during periodical maintenance and inspection.

Note

1. Avoid touching or contacting the residual gas and oils in compressor with exposed skin. Wear long rubber gloves to handle contaminated parts.

2. System contains refrigerant. Reclaim the refrigerant using standard reclaiming equipment before maintenance. Release of refrigerant to the atmosphere is harmful to the environment. Refrigerant must be recycled in accordance with state and local regulations.

4. Maintenance inspection checklist

Note

Regular inspections are necessary to ensure proper operation of the AC unit.

Table 7-1 Maintenance inspection checklist

SmartCabinet AC			
Date:		Prepared by:	
Model:		Serial Number:	
Type	Maintenance components	Item	Result
Monthly	Filter	Check for restricted airflow	
		Check the filter	
		Clean the filter	
	Indoor unit fan	Bearings in good condition	
	Drain system	Check and clean out unit drain pipes	
Semi-annually	Compressor	Signs of oil leaks	
		Vibration isolation	
	Refrigerant system	Suction pressure	
		Discharge pressure	
		Superheat	
		Evaporator in tight and clean condition	
		Charging capacity of refrigerant	
		Evident temperature difference between before and after the filter drier	
	Air-cooled condenser	Condenser coil is clean	
		Motor mounted tightly	
		Bearing in good condition	
		Refrigerant pipes properly supported	
	Electric board	Check electrical connections	
		Check the surface for signs of corrosion	
Notes:			
Signature:			

Make photocopies of this form for your records.

7.2.3 UPS Power Distribtuion System Maintenance

Fan Maintenance

The UPS fans are intended to run for 20000 hours ~ 40000 hours continuously. The higher the environmental temperature is, the shorter the fan life will be.

During UPS operation, verify the fan status once every half a year by confirming that the airflow can blow out from the ventilation holes on the rear panel of the UPS.

Checking UPS status

Clean the UPS periodically, especially the ventilation holes, to ensure free airflow inside the UPS. If necessary, clean the UPS with a vacuum cleaner. Confirm that the ventilation holes are unobstructed.

It is recommended to check the UPS operation status once every half a year.

Check the following items:

1. Check whether the UPS is faulty: Is the FAULT indicator on? Is the UPS giving any alarm?

2. Check whether the UPS is operating in Bypass mode. Normally, the UPS operates in Normal mode; if it operates in Bypass mode, find out the reason, such as operator intervention, overload, internal fault, and so on.

3. Check whether the battery is discharging: When mains is normal, the battery should not discharge; if the UPS operates in Battery mode, find out the reason, such as mains failure, battery test, operator intervention, and so on.

Note

Refer to *Liebert® ITA 5kVA UPS User Manual* for the detailed maintenance operation and replacing instructions.

7.3 Disassembly

SmartCabinet has substance and components (electronic elements) harmful to environment. Only professional technicians are allowed to disassemble SmartCabinet after the product life is ended. SmartCabinet must be send to special harmful substance handling center.

7.4 Troubleshooting

Judge possible causes for the fault through the run data and alarm information in the MSC-C monitoring system, and take measures against the faults, see Table 7-2.

Table 7-2 Troubleshooting

Fault phenomenon	Possible cause	Check or remedy
Environmental high temperature alarm	Unreasonable High temperature setpoint	Check and reset the high-temperature alarm point of the temperature sensors on the front door
	Use in overload	View whether the max. actual heating load is over the rated value
	Fan does not run normally	Check whether the fan air breaker is closed
	Fan is faulty	Call the customer service hotline of Emerson: 4008876510
	The AC refrigeration output is faulty	Call the customer service hotline of Emerson: 4008876510
	The closed doors are not closed completely	Check all closed doors and close them
Temperature unbalance	There are obstruct in the closed aisle	Check whether the equipment or the cables obstruct the closed aisle
	The user equipment are installed unevenly	Refer to this manual, adjust the cabinet loads until they are balanced
	The loads fluctuate violently in short term	View whether the large fluctuation exists in the actual loads
Door sensor alarm	The closed doors are not closed completely	Check all closed doors and close them
	The door sensor is not installed well or damaged	Readjust the installation clearance or call the customer service hotline of Emerson: 4008876510
Water leakage detective belt sensor alarm	There are water in the detection belt area	Check the leaking place in the computer room
	AC condensate water leakage	Check that the connection of the condensate water pipes is reliable
PDU over-load alarm	PDU exceeds the load setpoint	Check the actual load power of single PDU
	The power distribution or the PDU output has a short circuit	Check and clear up the risk of short circuit
Fan cannot start	Fan doesn't run normally	Check whether the fan MCB is closed
	Fan is faulty	Call the customer service hotline of Emerson: 4008876510
AC high pressure alarm	Insufficient condensing airflow	Remove debris from coil and air inlet; check the fan speed controller for its speed regulation performance
	Condenser fan not operating	Check that the cable connections of the fan speed controller are tight; check that the cable connections of the outdoor unit are tight; check that the fan speed controller L1 has output; check that the condensate pressure sensor works normally
Low pressure alarm	Refrigerant leakage	Check for leaking place and re-charge refrigerant
	Outdoor ambient temperature too low	Call the customer service hotline of Emerson: 4008876510
	Outdoor unit fan running at full speed upon low outdoor ambient temperature	Check that the L1 is connected with L in fan speed controller; check that the condensate pressure sensor is connected with the fan speed controller tightly
High temperature alarm	High temperature setpoint is unreasonable	Reset the setpoint of high temperature alarm
	Use in overload	Check the actual thermal power of the equipment in the cabinet
Low temperature alarm	Low temperature setpoint is unreasonable	Reset the setpoint of low temperature alarm

Appendix 1 Glossary

AC	Air conditioner
PDU	Power distribution unit
PMU	Power Management Unit
UPS	Uninterruptable power supply
DI	Digital Input
IE	Internet Explorer, a Web browser developed by Microsoft@
FAQ	Frequently Asked Questions
LCD	Liquid Crystal Display
LED	Light Emitting Diode
RCCB	Residual Current operated Circuit Creaker